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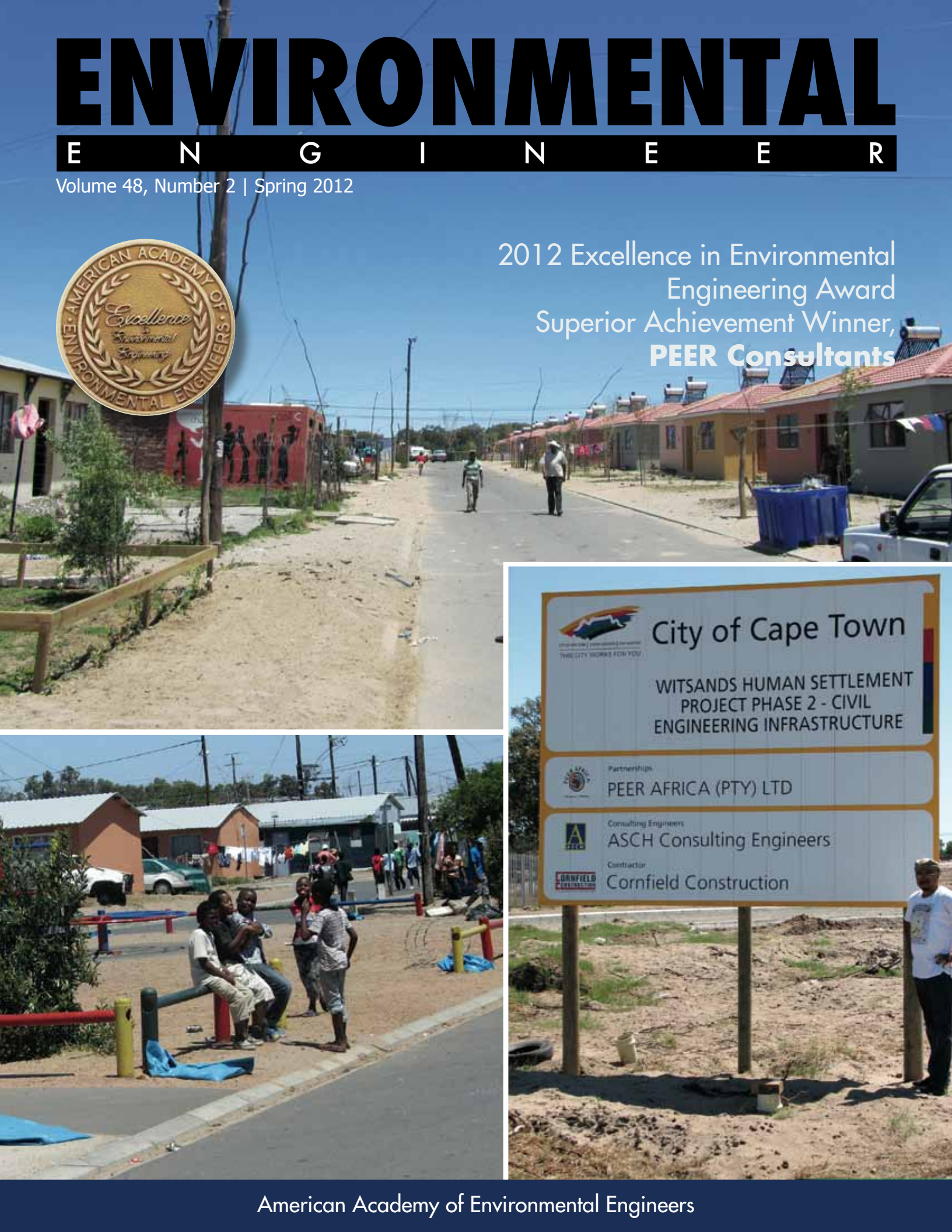
2012 Excellence in Environmental Engineering Award Superior Achievement Winner, **PEER Consultants**



American Academy of Environmental Engineers



AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS®

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President's Page

Michael W. Selna, P.E., BCEE

The Value of Board Certification

Any of us who have encouraged a colleague to become Board Certified by the Academy have faced questions such as these:

What will Board Certification do for me or my employer in terms of generating business or enhanced credibility?

How will it improve my career potential?

With limited professional development funding available from my employer, how can I justify joining AAEE when I might have to give up my membership in WEF, SWANA, AWWA, or ASCE, for example?

Having served on the Board of Trustees for six years and as chair of the Membership Committee, I often ask myself the following:

Does the profession value Board Certification and use it as a differentiator?

If we had a solid positive answer for the last question, the first three questions above would be easy to answer. So let's start with that last question and work back to the first three. Board Certification has historically been more associated with individual recognition than with providing a visible professional differentiator. In November 2010, we surveyed our members and found, not surprisingly, that "professional accomplishment/personal satisfaction" was the attribute given highest weight by the respondents followed by esteem and peer recognition. While recognition is certainly important both personally and professionally, Board Certification has much more to offer the profession and the public. Board Certification represents a higher standard, a measure of excellence, on which the public can rely.

Statistically, few Environmental Engineers pursue Board Certification. The most recent Bureau of Labor Statistics (May 2010) list an estimated 49,800 people employed as Environmental Engineers. That number is probably low because many engineers practice Environmental Engineering as Civil, Chemical, Mechanical, and a host of other engineering designations. With about 2500 Board Certified engineers, the Academy has credentialed less than five percent of practicing Environmental Engineers. Growth in environmental engineering employment can be anticipated, created by the need to deal with decaying infrastructure, population growth, more strict regulations and global environmental issues. The profession enjoys a positive public perception as evidenced by its ranking by *Money Magazine*. In its November 2010 issue, *Money* ranked Environmental Engineering as the fifth best job in America in its top 100 jobs review. The article also cited 31 percent projected growth in the next ten years.

Awakening the vast pool of public and private users of Environmental Engineering services to the value of Board Certification should be a main mission of the Academy.

Just as a surgeon becomes more valuable to heart patients when Board Certified as a cardiologist, Environmental Engineers become more valuable to their clients when they have passed the exam and experience requirements associated with Board Certification in one of the Academy's eight specialty areas[1].

The key word is *clients*. Awakening the vast pool of public and private users of Environmental Engineering services to the value of Board Certification should be a main mission of the Academy. To that end, we are forming a Working Group specifically focused on assisting public and private clients on qualifications-based selection concepts and the inclusion of Board Certification in their procurement approaches.

What can you do as an individual member? At a minimum you can display your credential in your correspondence and on your business card. This helps create visibility…people will ask, "What does BCEE mean?" A next step would be to get reconnected with your alma mater or local university or college and offer to speak to some of those 31 percenters who will be entering the profession over the next ten years. We have had a tripling of AAEE student chapters in the last year! Lastly, in your dealing with public and private clients, mention that the Academy provides free guidance in the form of the *Selection and Career Guide* on procurement of Environmental Engineering services. Offer to get a free copy of the publication into their hands or better yet point them to the online version[2].

So, back to those first three questions.

Business Opportunity/Credibility: A growing number of public agencies are including language in their RFP's that asks for a list of BCEEs and BCEEMs who will be assigned to the project. At last count, there were six large public agencies using the Academy's language contained in the *Selection and Career Guide*. That may seem small, but it is up from two agencies two years ago. In addition,

1 Air Pollution Control, Environmental Sustainability, Hazardous Waste Management, Industrial Hygiene, General Environmental Engineering, Radiation Protection, Solid Waste Management, Water Supply and Wastewater Engineering

2 http://www.aaee.net/DownloadCenter/SelectionandCareerGuide.pdf

with the number of Academy events being held (13 in 2011), client interaction at AAEE gatherings is a growing opportunity.

Career Potential: Most assuredly, adding BCEE or BCEEM on your resume has to help. Several prominent consulting firms and public agencies use Board Certification as a differentiator in internal selection processes or grant outright raises upon certification. As more of us display our credential, the initials BCEE and BCEEM will become more meaningful. Whenever I speak to a group, I start with the question: do you know what BCEE means? My experience is that far more people know the answer than just a few years ago.

Limited Professional Development Funds: We need to think differently about this. AAEE is not in competition with ASCE, WEF, AWWA, SWANA, and the remaining professional organizations representing Environmental Engineers, most of which are sponsoring organizations of AAEE. AAEE does not provide the breadth of benefits these larger organizations offer. However, AAEE is the only organization providing Board Certification in Environmental Engineering. Public and private employers may want to consider carving out a separate funding allotment for Board Certification because of the enhanced credibility Board Certified staff brings to the enterprise. This approach is actually practiced at several firms and agencies.

These aren't the only questions and the only answers associated with enhancing the visibility of the Academy. I would very much appreciate hearing your thoughts on how the Academy can better serve the profession. You can reach me at: michaelselna@socal.rr.com.

Member News

Specialty Certification

Jimmy (Chih-Ming) Kao, Ph.D., P.E., BCEE, has been transferred to Active status. Dr. Kao, Professor with National Sun Yat-Sen University (Taiwan), has been board certified in Hazardous Waste Management since 1998.

On the Move

William L. Marten, P.E., BCEE, has been named as a Technical Associate of Donohue & Associates in Wastewater Biological Processes & Nutrient Removal. Mr. Marten is a Senior Engineer/Project Manager at the firm. He has been board certified in Water Supply and Wastewater Engineering since 2009.

Alan H. Vicory, Jr., P.E., BCEE, has joined Stantec Consulting as a Principal. Mr. Vicory had previously been Executive Director of the Ohio River Valley Water Sanitation Commission. He is a Past President of AAEE and currently serves as the President of the Environmental Engineering Foundation. Mr. Vicory has been board certified in Water Supply and Wastewater Engineering since 1985.

Awards & Honors

Tapas Das, Ph.D., P.E., BCEE, has been elected as a Fellow of American Institute of Chemical Engineers (AIChE). He was awarded this honor during the AIChE national conference in October 2011. Dr. Das, Visiting Professor at St. Martin's University, serves on the AAEE Board of Trustees as the AIChE Trustee. He has been board certified in Air Pollution Control since 2002.

Michael Kavanaugh, Ph.D., P.E., BCEE, presented his Abel Wolman Distinguished Lecture, "Tradeoffs in Water Quality Management: Risk, Economics, and Equity" in April 2012. The event took place at the National Academies Keck Center in Washington, D.C. Dr. Kavanaugh, Principal at Geosyntec Consultants (Oakland, CA), holds two board certifications. He has been board certified in Water Supply and Wastewater Engineering since 1983 and in Environmental Sustainability since 2010.

Joseph F. Malina, Jr., Ph.D., P.E., DEE, D.WRE, has been selected as the 2012 Engineer of the Year by the Texas Society of Professional Engineers - Travis Chapter. He received his award at the Engineer's Week Banquet in February 2012. Dr. Malina, C.W. Cook Professor in Environmental Engineering at the University of Texas at Austin, is a Life Member. He has been board certified in Sanitary Engineering since 1972 and is currently a Trustee-at-Large of the Board of Trustees.

In Memoriam

Robert Perry, P.E., BCEE passed away on December 28, 2011. Mr. Perry held engineering and management positions of increasing responsibility in the Environmental and Public Works departments of the cities of Meadville, PA, Hamilton, OH, and the District of Columbia. He was the Manager of the Blue Plains Advanced Wastewater Treatment Plant. He completed his career as the Assistant Executive Director of the Water Environment Federation, from which he received an honorary membership. He loved his profession and worked in the early days of the environmental movement helping to create significant improvements in water quality for the communities he served.

Mr. Perry, a Life Member, had been board certified in Water Supply and Wastewater Engineering since 1967.

He was buried at Arlington Cemetery in honor of his service in WWII as a Navy tailgunner.

Volunteer of the Month

Congratulations to the following individuals who were nominated for Volunteer of the Month:

- James D. Herberg, P.E., BCEE - January 2012
- James W. Patterson, Ph.D., BCEEM - March 2012
- Stephanie Bolyard - April 2012.

Nominating someone as a Volunteer of the Month is a great way to recognize an AAEE member, state representative, or committee member for their dedication to AAEE. To nominate someone, simply send in your 350 word submittal and a picture to ymoulden@aaee.net. To view other nominations, visit http://www.aaee.net.

As of press time, AAEE was notified that C. Robert Baillod, Ph.D., P.E., BCEE, former Editor-in-Chief of *Environmental Engineer: Applied Research & Practice*, had passed away. As Chair of the Publications Committee, Dr. Baillod was instrumental in establishing the peer-reviewed journal. His dedication to the Academy and the Environmental Engineering profession was inspiring, and he will be dearly missed. *Environmental Engineer* will feature a tribute in the Summer issue.

Executive Director's Page

Joseph S. Cavarretta, CAE

Licensure and Certification, Accreditation, and the Big Picture

As many of you know, the Council of Engineering and Scientific Specialty Boards (CESB) is the accrediting body for the BCEE and BCEEM certifications of the American Academy of Environmental Engineers (soon to be called the American Academy of Environmental Engineers and Scientists—AAEES). CESB held its 2012 Annual Meeting in March. Among the important agenda items, two were of particular interest to the Academy. Outside of the agenda, a discussion with AAEE's representative on the CESB Board, AAEE Vice President Christian Davies-Venn, gave me food for conceptual thought in regards to the Academy's Sponsoring Organizations. I would like to hear from you on this item, so please read on.

Licensure, Certification (and Certificates) Defined

CESB in cooperation with the National Society of Professional Engineers settled on a definition of licensure versus certification in a document titled "Engineering Credentials." The document, which had been issued a few years ago, but was recently updated in association with NSPE, is now available on the NSPE Web site and includes a position statement by the National Council of Examiners for Engineering and Surveying. You can find it by searching NSPE's Web site (www.nspe.org) using the key words "Engineering Credentials," or you can email jcava@aaee.net for a copy.

Environmental engineers have an ever-challenging duty and responsibility to "ensure the public health, safety, and welfare to enable humankind to co-exist in harmony with nature"

BCEE Certification Reaccredited Through 2016

The Academy's certification: Board Certified Environmental Engineer was reaccredited for another five years. However, there is a caveat—one that CESB has been focusing on for the past few years with all constitutents: All certifying bodies must: "provide the public an opportunity to contribute to the formulation of policies and decisions of its certifying body, or explain in detail how its existing procedures provide this opportunity." Many organizations opt to comply by placing a "public" individual on its Board. AAEE has an extensive feedback system that includes, but is not limited to, AAEE Sponsoring Organizations. The system far exceeds most standards, and rightly so. That is why Academy initiatives today attract healthy and robust discussion among the BOT members. Over the coming months, we will post our feedback policy on the Web site. To request a copy, email jcava@aaee.net.

Academy Sponsoring Organizations

During the Academy's formative years, the purpose of Sponsoring Organizations on the BOT was to ensure that the Academy operated to serve the certification needs of those communities. Certification and its inherent application to specialty practices was, and still is, the core focus of the Academy's purpose. Breakfasts and lunches were held at S.O. conferences for the purpose of Diplomates (licensed engineers with specialty certifications) getting together with a key speaker to discuss their respective issues at their respective industry events: water and wastewater, solid waste, hazardous waste, industrial hygiene, air pollution control, etc. This still happens today. If you don't attend the Academy events at WEFTEC, APWA, SWANA, AWWA, A&WMA, and other S.O. conferences and the conferences of their chapters, you're missing a great educational and networking opportunity. I encourage you to make your best effort to participate. The Academy lists the events every month in Highpoints and ongoing on the Web site. The Sponsoring Organizations also support AAEE by offering exhibit space at their shows, encouraging participation in educational activities, and promoting certification and related programs to their related stakeholders.

However, it seems that the unique BOT structure of the Academy misses a powerful opportunity, albeit one I am at a loss to articulate. Here is one analogy: If I experience an adverse health issue, my first step is an appointment with the family physician. The physician makes a diagnosis. If the physician cannot treat the condition, he or she recommends a specialist. I will see that specialist and a series of other specialists until a best-diagnosis and treatment is determined. I cannot afford to pay a group of specialists to collaborate simultaneously on my condition. Environmental engineers have an ever-challenging duty and responsibility to "ensure the public health, safety, and welfare to enable humankind to co-exist in harmony with nature"; yet, like medical specialists, environmental engineers practice their specialties inside certain parameters. Think about core cross-industry issues that go beyond the scope of your existing technical society(ies) and your practice. Maybe some examples are hydraulic fracturing, deep well waste injection, deep well wastewater treatment, adapting roads and bridges to climate change. What about the unpredictable weather we're experiencing? Are those legitimate cross-industry issues? Can the Academy be used to address those issues or effectively serve as the table for discussion? Please email comments to me at jcava@aaee.net.

Education for the Environmental Engineers of the Future

by
Joel G. Burken, Ph.D., P.E., BCEE

In March, UNICEF and WHO announced that the world met the Millennium Development Goal (MDG) of decreasing the proportion of people without sustainable access to safe drinking water by half. The goal was met well ahead of the initial target date of 2015 (http://www.unicef.org/media/files/JMPreport2012.pdf). The UNICEF and WHO joint report noted that more than two billion people gained access to secure drinking water sources between 1990 and 2010. As a profession, environmental engineers and scientists should be proud for the role played in reaching this amazing goal. To accomplish such a goal and for future engineers and scientists to meet other goals, much more than a toolkit of technologies is needed. ***Technical training is not enough.***

Without question, as a global profession we should be proud of the role we played and many individuals can take pride in their specific efforts that contributed. I have observed my colleagues and students take part, first hand, in working abroad to help this take place in making this happen, and I take no direct credit as I have not ventured beyond our borders to help reach this amazing goal ahead of schedule. So I personally applaud my colleagues and friends and also look at our profession and the educational foundation that has helped facilitate the roles of the many individuals that contributed. While applauding individuals, certain organizations like Engineers Without Borders (EWB) and non-governmental organization (NGOs) agencies like Water.org have developed from the passion of a few individuals into organizations that train and facilitate many individuals to work in a community and coordinate an array of talents. Even more, these organizations offer a lightning rod to draw talented individuals to our field, particularly those with an altruistic drive to 'do more.' As I look at how our own student profiles and activities have transformed from a decade ago, the changes are remarkable. Our student EWB chapter of over 120 members has developed four international campus-wide design and travel teams that collectively raise and coordinate a budget of $180,000 annually. The students take on this leadership as an extracurricular activity and, many times, at some personal expense for travel. We also have year-long courses that take students on multiple international trips to implement designs developed as part of a service learning class. These classes certainly have a technical and scientific backing, but accomplishing this goal was not so much about Bernouli's equation, nanotechnologies, or microbial and chemical kinetics. To accomplish the goal of bringing secure water to two billion people in 20 years, social issues, cultural acceptance, financing mechanisms, and educating people to maintain the infrastructure were all necessary to address. ***Technical training is not enough*** for our future generations, and we need to incorporate changes into our education approach and our profession.

International activities are not the only unique experiences students can now tackle, nor are these the central challenges most will face in their careers. In professional practice, integrating new environmental technologies, project planning and delivery methods, and integration of technologies far outside their expertise are more likely career challenges to be faced. Such challenges are also part of the on-campus activities for many students. A prime example at our campus is the Solar Decathlon team that undertakes a two-year project to conceptualize, design, build, and transport a solar powered home as part of the Department of Energy International Solar Decathlon competition including 16 US-based and 4 international teams (http://www.solardecathlon.gov). These homes are then brought back to our campus and become part of our Solar Village, available to students and faculty for campus residences. These experiences are amazing, but certainly not all universities can offer all these opportunities, and this level of commitment is not for all students either. At Missouri S&T, we are planning to require students to have either an international educational experience, such as an EWB project and trip, or to have an internship/externship integrated into the educational experience. To incorporate these experiences into their education, students will focus learning on international project logistics and delivery, and in the externships, they learn how the companies develop strategic business and marketing plans and develop strategies to stay at the cutting edge of technology and engineering. As technical topics are not enough for preparing our future engineers, these approaches are just a few examples at how we can educate and train our future engineers, in environmental and many other fields.

To help address our expanding scope of environmental engineering education as a profession, AEESP is looking to disseminate information on unique opportunities and advance the teaching portfolio and develop a repository of educational materials to help educate students on unique and expanding topics. Electronic modules, case studies, and examples of how to teach new and expanding topics such as sustainability, life cycle analysis, or climate change mitigation are targeted to be developed and disseminated. We have been working

continued on page 11

AAEE S&YPC and Student Chapters

By Stephanie Bolyard

In an effort to increase student and young professional membership and participation in the Academy, AAEE established a Students and Young Professional Committee (S&YPC) in 2009. It was recognized that student and young professional membership is a first step for a lifelong career in Environmental Engineering, and this committee created an opportunity to facilitate career and professional development opportunities by linking its members with practicing Environmental Engineers. The goal of this committee is to increase student and young professional membership in the Academy and promote awareness of the disciplines of environmental engineering. This will be accomplished by providing students and young professionals with the opportunity to be involved in student chapter activities, facilitate networking opportunities within the engineering community, and increase awareness of environmental engineering and certification.

1


2

Since AAEE began its efforts to increase student and young professional involvement, a total of eight universities have established student chapters which include Columbia University, Johns Hopkins University, Ohio State University, Old Dominion University, Texas A&M University, Kingsville, University of California, Irvine, and University of Colorado, Boulder. This tremendous step towards increasing members was due to the efforts of the following AAEE members Michael Selna (AAEE President), Joe Cavarretta (AAEE Executive Director), Debra Reinhart (UCF), Hedi Alavi (Johns Hopkins), and Stephanie Bolyard (UCF).

Student chapter activities typically include hosting meetings with an invited guest speaker and participating in community service projects, networking events, and student organization fairs. The UCI student chapter has participated in an event to promote their AAEE student chapter along with hosting chapter meetings (Pictures 1 and 2). The newly formed student chapter at Johns Hopkins University in Baltimore, MD, was established by four very energetic senior undergraduates in the Department of Geography and Environmental Engineering with the assistance of Dr. Hedy Alavi, who is a faculty member of Johns Hopkins University and a Board Certified Environmental Engineer. The chapter hosted a very successful inaugural meeting on February 23, 2012, with Dr. Christian Davies-Venn, P.E., BCEE, as the keynote speaker (Picture 3). Dr. Davies-Venn is currently vice president of AAEE, a practicing consultant, and also a part-time faculty member at Johns Hopkins. Dr. Davies-Venn's presentation provided an overview of the benefits of membership in AAEE, how to become involved in the environmental profession, and the challenges facing the environmental profession in the coming years.

The S&YPC goals for the upcoming year are to continue promoting student and young professional membership along with the formation of student chapters, and to ensure the continued success of the existing student chapters. If you are interested in forming a student chapter or becoming a member of this committee, please contact S&YPC Chair Stephanie Bolyard (Stephanie.bolyard@ucf.edu).

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Officer Nominees for 2013

The Academy's Nominating Committee is chaired by Past President Brian P. Flynn. Its members include Jeffrey H. Greenfield, R. Tim Haug, Cecil Lue-Hing, James Mihelcic, and Debra R. Reinhart. The following candidates have been recommended for 2013.

President-Elect
Christian Davies-Venn, Ph.D., P.E., BCEE

Vice President Candidates
Howard B. LaFever, P.E., BCEE
James F. Stahl, P.E., BCEE

Trustee-at-Large Candidates (up to two)
David A. Chin, Ph.D., P.E., BCEE
Michael C. Kavanaugh, Ph.D., P.E., BCEE
James W. Patterson, Ph.D., BCEEM
Joseph C. Reichenberger, P.E., BCEE

President-Elect

Christian Davies-Venn, Ph.D., P.E., BCEE, is Vice President and Chief Engineer of PEER Consultants with 35 years experience in environmental engineering. He received his B.S in Civil Engineering from the University of Sierra Leone, and M.S. and Ph.D. degrees in Environmental Engineering from the University of Cincinnati and the University of Arkansas, respectively. He is a registered Professional Engineer in Maryland, Virginia, District of Columbia, Michigan, Tennessee, and Florida. He is also an Adjunct Faculty at Johns Hopkins University, Whiting School of Engineering.

Dr. Davies-Venn was certified as a Diplomate of the Academy in 1996. He has served as Assistant Treasurer, Treasurer, and Chair of the Finance Committee. He has also served on several committees including Chair of the Ad Hoc Working Group sub-committee on Examination Eligibility, the Ad Hoc Working Group on membership classifications and requirements for certification and re-certification, and on the Strategic Planning Committee. Since 2005, he has served as the Academy's representative to the Council of Engineering and Scientific Specialty Boards (CESB). In this capacity, he has served on several CESB committees including the Accreditation and Admissions Committee and the Nominating Committee. He currently serves on the Executive Committee, the Committee on Professional Engineer Specialty Certification and as Chair of the Committee on Graduate Engineer Certification.

Dr. Davies-Venn is also active in several sponsoring organizations and other professional organizations including the Water Environment Federation, the National Society of Professional Engineers, the American Society of Civil Engineers, the American Water Works Association, the Chesapeake Water Environment Association, the Water Environment Research Foundation, the Mid-Atlantic Biosolids Association, and the Federal Water Quality Association. He has been actively involved in mentoring young professionals and implementing the strategic mission of the Academy.

Vice President

Howard B. LaFever, P.E., BCEE, is currently a Principal at GHD Inc. (f/k/a Stearns & Wheler, LLC), a global engineering, architectural, and environmental consulting company working out of the Cazenovia, New York, office. He has served the company for 39 years, with a specialty in wastewater, solid waste, and pipeline infrastructure. His recent emphasis has been in the area of "Sustainability." Mr. LaFever earned a B.S. in Civil Engineering from Clarkson University in 1968 and a M.S. in Sanitary Engineering from Cornell University in 1973. He became a Diplomate in 1982 in the Water/Wastewater specialty and recently received certification in the Environmental Sustainability specialty from AAEE.

Mr. LaFever has been a strong supporter and advocate of the Academy at his company by incorporating AAEE certification as part of the professional development track for young professionals. He served on the Academy Board of Trustees for six years representing the American Public Works Association (APWA), and is currently serving in his third year as Treasurer and Chairman of the Finance Committee. He previously served on the Finance, Audit, Membership, Awards, and Executive committees.

Mr. LaFever has just recently been elected as Vice Chairman for the newly-formed Institute for Sustainable Infrastructure (ISI) formed by ASCE, ACEC, and APWA, and currently serves on the APWA Center for Sustainability. He strongly believes that the Academy can play a vital role in the education, training, and certification of professionals leading the way to sustainable solutions to rebuild our aged infrastructure.

He strongly supports the importance of certification and enhancing the range of the environmental profession. He will work hard through strong leadership to strengthen the growth in membership, implement the strategic plan, and gain more involvement from the younger members and students.

James F. Stahl, P.E., BCEE, is a Vice President and Senior Technical Advisor for MWH Americas (MWH). Prior to joining MWH, he was a member of the engineering staff of the Sanitation Districts of Los Angeles County for 38 years, retiring as the Districts Chief Engineer and General Manager in 2007. The Districts provide wastewater treatment and solid waste management needs for approximately five million people and 1400 major industries. At the Agency, he served in various technical and managerial assignments involving wastewater research, operations, treatment plant design and solid waste. At MWH, Mr. Stahl has been an advisor to municipal and industrial clients across the United States in formulating strategies for cost effective and environmentally responsible wastewater infrastructure. Throughout his 45+ year environmental engineering career, he has been actively involved in the planning, implementation, and operation of a vast array of sustainable,

innovative environmental engineering projects and programs. These have included a 400 mgd high purity oxygen activated sludge system, comprehensive odor control technologies, diverse biosolids handling and recycling elements, water reclamation and reuse systems, biogas energy and alternative fuel plants, state-of-the-art materials recovery facilities and landfills, and unique public education programs.

Mr. Stahl holds a B.S. in Civil Engineering from Loyola Marymount University, a M.S. in Environmental Engineering from Stanford University, and a California P.E. license. He has served on the Program Committee and various technical committees of the Water Environment Federation; is past Chairman of the Board of Directors of the Water Environment Research Foundation; past President of the California Association of Sanitation Agencies, and a member of the National Academy of Engineering. He has been a BCEE of the American Academy of Environmental Engineers and Scientists since 1982, currently serves on the Academy's Board of Trustees and is the recipient of the Academy's Edward J. Cleary and Gordon Maskew Fair Awards.

Trustee-at-Large

David A. Chin, Ph.D., P.E., BCEE, is currently a Professor of Environmental Engineering at the University of Miami and is Chairman of the AAEE Education Committee. Dr. Chin served as Chairman of the Department of Civil, Architectural, and Environmental Engineering at the University of Miami for 13 years, and is the author of two major environmental engineering textbooks: *Water-Quality Engineering in Natural Systems,* published by John Wiley and Sons, and *Water-Resources Engineering,* published by Prentice-Hall.

Dr. Chin actively contributes to the improvement of environmental engineering education in the United States by serving as an ABET program evaluator for both AAEE and ASCE, and he has served in this capacity for more than a decade. Dr. Chin also performs a significant amount of public service, primarily as one of five members of the Environmental Quality Control Board (EQCB) of Miami-Dade County, Florida, and is responsible for reviewing applications for variances and waivers of Miami-Dade environmental regulations.

Dr. Chin's research interests are in the areas of terrestrial fate and transport of bacteria, quantification of TMDLs to account for uncertainty, ground-water remediation, and environmental hydrology. His technical contributions to these fields are published regularly in professional journals.

Dr. Chin is a past recipient of the prestigious Collingwood Award by ASCE, and has received both the Outstanding Teacher Award and Outstanding Research Award at the University of Miami. Dr. Chin's postgraduate academic training was received at Georgia Tech (Ph.D.) and Caltech (M.S.).

Michael C. Kavanaugh, Ph.D., P.E., BCEE, is Senior Principal with Geosyntec Consultants, Inc. He is a chemical and environmental engineer with over 38 years of consulting and teaching experience. He has held various senior positions in the firms of MWH, ENVIRON and Malcolm Pirnie/ARCADIS and was a Research Associate at the Swiss Institute of Water Research (EAWAG). Dr. Kavanaugh has been an engineer, manager, principal-in-charge, or technical director on over 200 projects covering a range of environmental problems. He has authored or co-authored 35 peer-reviewed technical publications and edited four books on water quality, water treatment, and groundwater cleanup. Dr. Kavanaugh currently lectures on soil and groundwater remediation topics in Princeton Hydrology and Remediation professional courses.

Dr. Kavanaugh has completed assignments with the National Research Council chairing both the Water Science and Technology Board and the Board on Radioactive Waste Management. He also chaired the National Research Council (NRC) committee on alternatives for ground water cleanup in 1994. He currently chairs a NRC committee addressing the future of subsurface remediation efforts in the U.S. Dr. Kavanaugh has served on several research committees of the AWWA and WEF, and was one of the original members of the Water Environment Federation Research Advisory Board. He is a member of the AAEE research publications committee. In 1993, Dr. Kavanaugh was the AAEE Kappe Lecturer. He was elected into the National Academy of Engineering in 1998.

Dr. Kavanaugh is a registered engineer in California, and a Board Certified Environmental Engineer, certified in water/wastewater and environmental sustainability. He is also a consulting professor in the Civil and Environmental Engineering Department at Stanford University. Dr. Kavanaugh is a Board Member of the Environmental Law Institute. He has a Ph.D. in civil/environmental engineering from the University of California at Berkeley, and B.S. and M.S. degrees in chemical engineering from Stanford and UC Berkeley, respectively.

James Patterson, Ph.D., BCEEM, is an internationally recognized expert on industrial pollution control, and Principal of the environmental engineering consulting firm Patterson Environmental Consultants, Inc. He served as Professor and Chairman of the Pritzker Department of Environmental Engineering at the Illinois Institute of Technology (IIT) in Chicago for 20 years, and as Director of the USEPA-sponsored Industrial Waste Elimination Research Center of Excellence at IIT for 8 years. He received his Ph.D. in Environmental Engineering in 1970, from the University of Florida and his B.S. and M.S. degrees in 1964 and 1967, respectively, from Auburn University.

Dr. Patterson serves as Vice Chair of both the AAEE Membership Committee and the AAEE Board Certification by Eminence Committee. He actively participated in, and strongly supported, the recent AAEE assessment to extend Certification to Environmental Scientists, reflecting the true interdisciplinary mandate of effective environmental management. That initiative was recently approved by the Academy Board of Trustees, and the first class of Environmental Scientists will be Board-Certified this Spring. This expansion will offer numerous opportunities, and challenges to the Academy.

Dr. Patterson has served as an international consultant and advisor to numerous industries and governmental agencies, and is the author of two books on industrial wastewater treatment technology, the editor of a three-volume series on pollution prevention, co-editor of a nine-volume series on water quality management, and he has authored

more than 100 other book chapters and technical papers. He has served as Chair of the Board of Editors of the WEF Journal Water Environment Research, Chair of the International Joint Commission Expert Committee on Engineering and Technological Aspects of Great Lakes Water Quality, and Executive Director of the State of Illinois Hazardous Waste Task Force.

Joseph C. Reichenberger, P.E., BCEE, is Professor of Civil Engineering and Environmental Science and Director of the Graduate Civil Engineering and Environmental Science Program at Loyola Marymount University, Los Angeles, CA. He teaches courses in water quality management and water and wastewater treatment and has been with Loyola Marymount for the past 19 years full time. He also serves as President of the Board of Directors of the San Gabriel Valley Municipal Water District, an elected position he has held since 1989.

Professor Reichenberger began his career with the Los Angeles County Flood Control District. He joined the firm of Daniel, Mann, Johnson and Mendenhall as a civil and environmental engineer three years later. After 13 years with DMJM, he joined Engineering-Science Inc./Parsons and served as Vice President and Western Operations Manager before joining Loyola Marymount in 1993. Reichenberger has a BCE from Marquette University and MSCE from the University of Southern California, is a registered professional engineer in California and four other western states and holds a T-5 Water Treatment Plant Operators Certificate.

He is a Fellow and Life Member of ASCE, Life Member of AWWA, WEF, and AAEE and a member of AEESP. He has been active with AAEE serving as State Chairman for Southern California for a number of years and currently serves the Workshops and Seminars Committee and the Environmental Science Advisory Panel.

He has been chapter author, reviewer, or contributor for a number of AWWA and WEF publications including the *Design of Municipal Wastewater Treatment Plants (MOP 8)*, *International Standard Units for Water & Wastewater Processes (MOP-6)*, *Wastewater Treatment Plant Design Handbook*, *Design of Municipal Water Treatment Plants*, *Use of Recycled Water to Augment Potable Water Supplies*, and *Capital Project Delivery (M47)*.

Professor Reichenberger understands the value of board certification and strongly promotes certification in both professional practice and academia.

Education for the Environmental Engineers of the Future

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on courses offered live, simultaneously, to multiple campuses with lectures and case studies offered from a professor at yet another campus. We certainly do not rely on textbooks alone, particularly for many novel topics that are moving at a faster pace than traditional publishing. As students are more in tune with learning from podcasts and multimedia tools are readily available, education on the fly is part of our toolbox. These advances will also impact our abilities for distance education, where entire courses can be offered globally and can be used in continuing education, graduate education, and post-BS certificate programs. This also ties into efforts like the AAEE Environmental Sustainability specialty certification to promote continued education and assessments for environmental engineers. Overall as a profession, we should strive toward preparing our students to enter the profession and provide resources to continue in lifelong learning.

AEESP is looking at how to increase our national and international effort to assist in improving and expanding our abilities to facilitate learning beyond the classroom…

So, as we look to the future and how we educate and train future environmental engineers, AEESP is looking at how to increase our national and international effort to assist in improving and expanding our abilities to facilitate learning beyond the classroom and beyond graduation as well. As educators, we can look to professional societies like AAEE and organizations like EWB to help provide an array of experiences and expertise. Without doubt, they will face challenges we have not yet imagined and as they go out and shape our future society. ***Technical training is not enough.***

About the Author

Dr. Joel Burken is Associate Chair and Professor at Missouri University of Science and Technology and President of AEESP

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Jennifer Stone
Austen Sybert
David Vargas
Mary Vitale
Ning-Yuan Wang
Tiffany Wei
Nicholas White
Yue Wu
Yunpeng Zhai
Chongyang Zhao

Gordon Maskew Fair Award

C. P. Huang, Ph.D., BCEEM

Dr. C.P. Huang, Donald C. Phillips Professor of Civil and Environmental Engineering at the University of Delaware, began his academic career at Harvard University where he studied aquatic chemistry under the direction of Professor Werner Stumm in 1966. After earning his Ph.D. in 1971, he taught at Wayne State University before joining the University of Delaware in 1974.

His research specialties are: (1) specific chemical interactions at the solid-liquid interfaces, (2) the chemistry and control of heavy metals, and (3) advanced oxidation processes for water and wastewater treatment. Recently, he expanded his research activities into environmental nanotechnology with an emphasis on developing innovative nanomaterials and systems for environmental applications, studying the fate and transport of engineered nanoparticles in the aquatic environment, and investigating the responses of ecological systems to engineered nanoparticles.

He has mentored 8 post-doctors and supervised the thesis research of 100 graduate students (59 M.S. and 41 Ph. D.). The majority of his students and post-doctors are faculty members at major universities in USA, Taiwan, Korea, Germany, Turkey, and Brazil.

Professor Huang has received numerous honors including the Gordon Maskew Fair Medal from Water Environment Federation for worthy accomplishments in the training and development of future engineers in 1999, the Best Theoretical Paper Award from the World Water and Environmental Congress for research in activated carbon adsorption of volatile organic carbon in 2003, and the Wesley W. Horner Award from the American Society of Civil Engineers for research in sonochemical process for the inactivation of Cryptosporidium in water in 2008.

Otis J. Sproul, Ph.D., P.E, BCEE

Dr. Otis J. Sproul is an Emeritus Dean and Professor of Civil Engineering in the College of Engineering and Physical Sciences at the University of New Hampshire. He received his B. S. and M. S. in Civil Engineering from the University of Maine in 1952 and 1957, respectively. He received his Doctor of Science in Sanitary Engineering degree from Washington University in St. Louis in 1961. Dr. Sproul has taught at the University of Maine, taught and served as chair in the Department of Civil Engineering at The Ohio State University and served as Dean of the College of Engineering and Physical Sciences at the University of New Hampshire.

Dr. Sproul and his graduate students were among the earliest engineers to engage in research that developed useful data for the inactivation and removal of viruses and parasites from water, wastewater, and in the natural environment. Among other areas, the work provided data useful in developing engineering criteria for relationships between the contact time, type, and concentration of disinfectants used, temperature, and characteristics of viruses themselves. Chemical adsorbents used or formed through chemical reactions in water treatment processes and on natural adsorbents, such as clays in the natural environment, were also studied to determine and optimize the virus removal mechanisms on these materials. Disinfection models for parasitic cysts were also developed with other graduate students.

Dr. Sproul has been active in ABET, Inc., representing AAEE as a commissioner for five years on the Engineering Accreditation Commission (EAC) and is currently serving another five year term on the Technology Accreditation Commission. During this service Dr. Sproul was active in Academy and EAC discussions leading to changes in ABET's General Criteria for Masters Level Programs that substantially benefited accreditation practices in master's level programs with fewer programs, such as environmental engineering.

Dr. Sproul has served as Editor of the Journal of Environmental Engineering (ASCE) and currently serves as the editor of the *Environmental Engineer: Applied Research and Practice* (AAEE). He co-founded the International Ozone Association with a dozen other directors. His work is published in over 100 referred and unreferred papers, book chapters, and an edited book.

Edward J. Cleary Award

Joseph F. Malina, Jr., Ph.D., P.E., BCEE, D.WRE

Dr. Joseph F. Malina, Jr., P.E., BCEE, D.WRE, is the C.W. Cook Professor in Environmental Engineering at The University of Texas at Austin. A Diplomate of the AAEE since 1972 and Life Member since 2004, Dr. Malina's service to AAEE includes Committees on Goals and Administration (1980-81), Membership (1982-88), Education (1982-88), and Board of Trustees (1991-94). He is currently a Trustee-at-Large. He continues to represent AAEE in the ABET Accreditation process as a program evaluator since 1981, and served on the Engineering Accreditation Commission from 1982 to 1987.

Born in Brooklyn, NY, Dr. Malina earned a BCE at Manhattan College in 1957, an MSCE in 1959, and a Ph.D. in 1961, at the University of Wisconsin, Madison. He has dedicated more than 50 years teaching and mentoring undergraduate and graduate students at The University of Texas at Austin. He presented short courses on wastewater and sludge treatment in the U.S. and overseas and has published numerous technical and professional papers.

His professional contributions are recognized by numerous awards such as the Gordon Maskew Fair Award 1984 (AAEE) the Lifetime Achievement Award, 2006 (WEAT), Outstanding Civil Engineer Award 2005 (Austin Branch, ASCE), and most recently, the TSPE 2012 Engineer of the Year Award, Travis Chapter.

He is a Life member of ASCE, AWWA, WEF, AAEE, and TSPE. He is a Founding Member of the ASCE Environmental and Water Resources Institute, and a Diplomate of the American Academy of Water Resources Engineers. He is a licensed professional engineer in Texas and a member of the TSPE and the NSPE.

Stanley E. Kappe Award

Stephen G. Lippy, P.E., BCEE

In 1972, Steve Lippy graduated with a B.S. in Civil Engineering with Distinction from Virginia Polytechnic Institute and State University.

From graduation and until he retired March 1, 2012, he was an engineer in the Baltimore County Bureau of Solid Waste Management where he oversaw the design, construction, and environmental monitoring of the county landfills. He received his P.E. in 1976, certification in solid waste management by AAEE in 1982; and was recently certified as Manager of Landfill Operations by the Solid Waste Association of North America. In 1981, he received ASCE's Maryland Section "Young Engineer of the Year Award."

In 1982, he became a member of GRCDA, the predecessor to SWANA. He was a founder in 1983 of the Mid-Atlantic Chapter, has served continuously on its Board of Directors (including three terms as President), as well as a local committee co-chair for four SWANA international conventions. He is an active member of the Landfill Management Technical Division and reviewer of SWANA manuals, courses, and more.

In 1989, he was selected a Life Member by his Chapter; became a Professional Award-Life Member in 2002; and starting in 2007, became SWANA's representative on AAEE's Board of Trustees.

While on the BOT, he has attended all 10 BOT meetings to date and has actively served on the Planning; Bylaws, Policies, & Procedures; and Membership committees, as well as serving as the BOT liaison to the Solid Waste Management and General Environment Engineering committees. In the 1980's, he served on the Exam Upgrading Committee and was chair of the Solid Waste Management Committee.

He has been a strong advocate of AAEE, professionalism, and certification to colleagues and peers.

Honorary Member

Lieutenant General Robert L. Van Antwerp, Jr., M.Sc., M.B.A., P.E.

R.L. "Van" VanAntwerp LTG (Ret.) was appointed Chief of Infrastructure and Executive Development for the Flippen Group in July 2011. The Flippen Group is a Texas based leadership and organizational development company that specializes in talent assessment and alignment. They work with a wide range of clients in the corporate, sports, education, and not for profit sectors.

Van leads the new Infrastructure Group that works with other organizations to develop teams and acquire resources needed to rebuild roads, waterways, schools, and utilities that are critical to improving the fabric of society.

Van retired from the Army after 39 years of service and most recently served as Chief of Engineers and Commanding General of the U.S Army Corps of Engineers (USACE). He was the senior military officer overseeing a $40+ billion program including most of the nation's civil works infrastructure and military construction on 250 Army and Air Force installations worldwide. As the USACE Commanding General, he was responsible for over 37,000 employees who provided engineering, project management, construction, and operation and maintenance support in nearly 100 countries around the world.

Van is a graduate of the United States Military Academy at West Point and holds an M.B.A from Long Island University and a M.S. in Mechanical Engineering from the University of Michigan. He is a Registered Professional Engineer.

Van and his wife, Paula, have three sons, Jeff, Luke, and Robby; two daughters, Julia and Kathryn and seven grandchildren, Taylor, Luke, Jake, Ben, Hayne, Natalie, and Maggie. They reside in North Carolina.

W. Brewster Snow Award

Sarah Ness

Ms. Sarah Ness is enrolled in the Master's of Science in Environmental Engineering program at the University of South Florida. She is also part of the Master's International Peace Corps program that allows her to combine her graduate education with service in the Peace Corps and international thesis research. Sarah has had the opportunity to gain knowledge and experience through engineering classes, including traditional courses such as Aquatic Chemistry, Environmental Biotechnology, and Physical-Chemical Principles, and non-traditional classes including Sustainable Development Engineering and Green Engineering for Sustainability. Additionally, her graduate program requires coursework in anthropology and public health and service in the Peace Corps. Sarah will be leaving for her 27-month Peace Corps service in Liberia this June. While in Liberia, Sarah intends to implement water and sanitation projects and educate students on the importance of environmental engineering, math, science, and public health. During this service, she will also be conducting research in Liberia to complete her MS thesis.

Prior to starting her Master's program, Sarah graduated from the University of Maryland, College Park with a BS in Civil Engineering. She then worked for several years as a Water and Wastewater Project Engineer for Gannett Fleming, Inc. in Baltimore, MD. Sarah has obtained her EIT and plans to acquire her Professional Engineering license upon finishing her MS degree. She has also been highly involved with the non-profit Engineers Without Borders-USA throughout her academic and young professional career, serving as the President of the UMCP student chapter, President of the Southeast Region, and member of the EWB-USA Governance Committee.

Sponsored by The Environmental Engineering Foundation

W. Wesley Eckenfelder Graduate Research Award

Xia He

Xia He received her Bachelor of Science degree in Water Supply & Drainage Engineering from Xi'an University of Technology in 2004. She then joined the Environmental Science & Engineering Program at Shanghai Jiao Tong University, where she attended a wastewater control group and got involved in a research project funded by the National Nature Science Foundation of China to study nitrogen removal from wastewater by heterotrophic nitrification. She finished her Master of Science degree in 2007, and joined Dr. de los Reyes' research group at North Carolina State University in August 2007 to work on her doctoral degree; she studied about fat, oil, and grease (FOG) removal from wastewater by bioaugmentation and FOG deposit formation mechanisms in sewer lines.

Xia He's research interests encompass projects for wastewater control. Specific areas of research include the novel biological reactor design, nutrients removal from wastewater, dynamics of microbial populations in biological systems, blockages in sewer systems, and energy generation from wastewater.

Sponsored by HDR

Excellence in Environmental Engineering Education

George Tchobanoglous, Ph.D., P.E., BCEE

Dr. George Tchobanoglous is Professor Emeritus in the Department of Civil and Environmental Engineering at the University of California, Davis. His research interests are in the areas of wastewater treatment and water reuse, small and decentralized wastewater management systems, and solid waste management. He has authored or co-authored over 500 technical publications including 22 textbooks and 8 reference works. His books are well known for successfully bridging the gap between academia and the day-to-day world of the engineer. He has given more than 500 technical presentations, both in the United States and abroad. He is a past president of the Association of Environmental Engineers and Science Professors. Among his many honors, in 2003, he received the Clarke Prize from the National Water Research Institute. In 2004, he received the Distinguished Service Award for Research and Education in Integrated Waste Management from the Waste-To-Energy Research and Technology Council. In 2004, he was also inducted into the National Academy of Engineering. In 2005, he was awarded an honorary Doctor of Engineering from the Colorado School of Mines. In 2007, he received the Frederick George Pohland Medal awarded by AAEE and AEESP. His degrees include a B.S. degree in civil engineering from the University of the Pacific, an M.S. degree in sanitary engineering from the University of California at Berkeley, and a Ph.D. in environmental engineering from Stanford University.

Sponsored by GHD Lee & Ro MWH and Parsons

The Environmental Communications Award

Communicating with the public at large and other constituents can be a complex and challenging issue. Communication and marketing plans must be designed to address the objectives and strategies of the campaign to reach a target audience.

With this in mind, in cooperation with the International Water Association and the PIA Awards, AAEE offered a new area of competition for 2012, the Environmental Communications Award.

Ten entries were submitted for the inaugural Environmental Communications Award. The criteria that an independent panel of judges used to assess the entries included:

- Future value to the water engineering profession,
- Creativity and clarity in portraying and communicating the messages,
- Effectiveness in delivery and achieving desired outcome, and
- Integrated Design Approach – Narrative and visual elements work together to achieve the communication objectives.

Three winners were selected: two Grand Prize winners and one Honor Award.

AAEE would like the following for serving as judges for the 2012 Environmental Communications Awards:

Judy Berkun Eric Byers
Ina Cunningham Marlene Hobel
Paul D. Koch, P.E., BCEE

Grand Prize

Entrant: Kennedy/Jenks Consultants
Engineer in Charge: Todd Reynolds, P.E., BCEE

Communicating Perspectives on Water Supply and Desalination Energy Use

Challenges to Address

The Regional Seawater Desalination Project has been proposed by the City of Santa Cruz Water Department and the Soquel Creek Water District (partnering as **scwd²**) to provide a reliable, supplemental water supply to the communities served by these two agencies. The decision to pursue a seawater desalination project was the culmination of more than 25 years of planning, studies, and public hearings.

Within the community, there is vocal opposition to the project coming from a coalition of community activists. Their concerns are based on a variety of environmental, social, and political issues. Since the energy requirement of the proposed project and the greenhouse gas emissions (GHGs) associated with its operation are among the major environmental concerns, **scwd²** developed a communications and public outreach plan specific to energy and GHGs. One of the challenges in designing this plan was presenting the complex issues of energy requirements and GHGs in terms that could be easily understood by community members and potentially could assuage some of their concerns.

Goals of the Communications Plan

The audience for the communications plan included a variety of community stakeholders such as opponents and supporters of the proposed desalination project, ratepayers, elected officials, and members of local business and environmental groups. The goal of the plan was to present an objective description of the energy requirements of the proposed project in comparison to the energy requirements of existing water supplies (groundwater and surface water). In addition, the energy requirements of the desalination project also were put into perspective with existing community energy requirements, such as the local hospital, the mall, and household televisions and refrigerators.

The materials used during the communication and public outreach plan used similar visual elements and adhered to a consistent narrative theme. The energy-specific communications campaign lasted from approximately January 2011 through December of 2011.

An Innovative, Integrated Approach Utilizing Creativity and Clarity

A robust public outreach program was established that blended traditional outreach methods with new and innovative methods of engaging the public to enhance the community dialogue and increase the general understanding of the energy requirements of the project. The communications plan utilized a series of strategies, including handouts, direct-mail pieces, community meetings, web pages, email broadcasts, social media, innovative community interviews using iPads, and development of a white paper on water supply and energy use. The strategies that **scwd²** found most effective are further described below.

iPad Interviews: Community members were interviewed using an iPad application that provided a five-minute interactive, educational exchange in which visual graphics were used to provide factual information and provide feedback in real-time. With this tool, **scwd²** could instantly gauge community concerns and quickly tailor the outreach and messaging accordingly to ensure effectiveness. This strategy is relatively new but has the potential

to enhance the way in which community outreach is conducted by public agencies.

For the **scwd²** project, we were able to learn that although some local community members are not yet convinced that desalination is the best solution for augmenting the water supply, many do believe that the agencies should continue to evaluate the project and its potential impacts. We also were able to clarify the specific misperception that the proposed project would include GHG-emitting smokestacks at the desalination facility.

Social Media: In an effort to reach a wider demographic, a project page was established on Facebook, and a series of advertisements were developed to appear during targeted time periods. Using several advertisement approaches, we were able to measure their effectiveness by the site traffic and craft future ads to reach wider audiences. The objective of this particular effort was to direct Facebook visitors to the **scwd²** website to learn more about the project.

White Paper: A white paper entitled "Perspectives on Water Supply Energy Use," created as a preface to an energy study being prepared as part of the project environmental review process, was designed as a more user-friendly document that included both charts and creative graphics to convey relative energy consumptions, as well as a narrative description and calculations. The paper also provided comparative energy requirements of household appliances (i.e. computers and light bulbs) and estimated how much more energy would be required for desalination.

Community Meeting: scwd² held an informational meeting focusing solely on energy use and GHGs related to desalination. Meeting materials included:

- A handout explaining how energy requirements and GHGs were calculated and the process under way to reduce the carbon footprint of the project.
- A PowerPoint presentation that provided the community with information about the energy study and the project goals to reduce GHGs.
- Displayboards that used graphics comparing energy use in the community with the energy required for a supplemental desalination.
- The meeting was videotaped by community television. The video was played repeatedly on local cable and is available on the **scwd²** website.

Effective Results and Future Value

The documented successful results from the communications plan included increased visits to the project website and Facebook page. As a result of the iPad interviews, a total of 1,600 community members were interviewed, and the results will be used to create messages for future public outreach efforts. Less tangible results included a perceived shift in the public debate away from the issue of energy related to desalination and an understanding that misperceptions about project energy use could be clarified using targeted educational materials. In addition, by packaging information into various formats (interviews, presentations, handouts) and investing time communicating the information, **scwd²** is establishing relationships with the community and can now be viewed as accessible, open to discussion, and trusted as a credible source of information.

Grand Prize

Entrant: DC Water

Engineer in Charge: Alan Heymann

Clean Rivers Project Communication Campaign

Public Education Campaign for CSO Control in Washington, DC

Situation Analysis

The District of Columbia is one of 772 older cities in the country with a combined sewer system, covering about a third of the city. Combined sewer systems were the engineering convention around the turn of the 20th century and were designed to carry both sanitary sewage and stormwater in the same pipe. The system operates well in dry weather. However, during rainstorms, the fast-moving, high-volume flow can exceed the capacity of the pipes in the system. To prevent sewer backups in buildings and flooded streets, these sewers were designed to overflow into the Anacostia and Potomac rivers and Rock Creek during rain events. Though the solution was preferable a century ago, we now know that these combined sewer overflows (CSOs) can cause water pollution problems due to bacteria, chemicals and debris from both the sanitary sewage and from urban runoff picking these up from roadways and sidewalks.

In 2005, DC Water (then DC WASA) was mandated by federal consent decree to build an engineering solution to reduce CSOs to the Anacostia River by 98 percent, and reduce CSOs on all three waterways by 96 percent overall. The solution to use tunnels, and a subsequent movement to pilot green infrastructure, are current communication challenges. In addition, DC Water had initial challenges simply in explaining the concept, educating the public, preparing the District for traffic and construction disruptions, and preparing customers for water and sewer rate increases to cover the project's current $2.6 billion price tag.

Audiences

Target audiences included anyone impacted by the project and by CSOs in the Potomac and Anacostia Rivers and Rock Creek. These included residents of the District of Columbia, city and local government officials, property owners, and the general public. Secondary audiences included environmental groups and the media. All of these publics were reached through multiple tactics in an integrated strategic communications plan.

Research and Evaluation

Since DC Water relies on ratepayer funds for operating expenses, budgets are tight. Expenditures for large research and evaluation projects are infrequent. Instead, research tends to be informal and anecdotal. We collect and analyze information before launching a campaign, during the campaign

and afterwards by soliciting feedback at town Hall Meetings (held annually), talking with our Customer Service Call Center representatives, being aware of questions and concerns that come into the "GM Suggestions" or "Info@dcwater.com" email addresses, monitoring social networks such as Twitter and Facebook, and checking in regularly with local government ANCs (Advisory Neighborhood Commissioners – a community-level local government structure).

Planning and Evaluation

DC Water has been communicating to its publics about the Clean Rivers Project for several years and will continue to do so until the project is complete, around 2025. In the past year, the campaign has focused on the following.

Goals

- Raise awareness and educate stakeholders about the need for CSO control.
  1. Explain what a CSO is.
  2. Explain why CSOs are undesirable.
  3. What is the solution?
  4. How does the solution impact stakeholders?
- Keep the public updated on construction activities related to the Clean Rivers Project.
- Position DC Water as a forward-thinking, leading environmental agency committed to creating sustainable solutions.

Strategies and Tactics

DC Water routinely employs a robust combination of communication channels including traditional media, social media, publications, website, video, direct mail, outreach activities, government relations and speaker engagements. The Authority is fortunate to have at its helm a nationally recognized environmentalist in General Manager George S. Hawkins, who is highly sought for speaker engagements, industry and trade association committee membership and media interviews. He is credible, passionate, personable and knowledgeable.

Since this specific project touches everyone in the District, it was important to select communication channels to reach everyone. For those who use technology, the Authority's Office of External Affairs (OEA) tweets over Twitter during business hours and beyond, and maintains a Facebook page, a YouTube Channel and FlickrGallery. The department uses its website to reach the general public, but recognizes that low-income residents, the elderly and some other populations may not use, or have access to, the website. For these individuals, the Authority leverages direct mail in the form of bill inserts for the 120,000+ customers who receive a DC Water bill, and provides other printed pieces. For the illiterate or sight-challenged, the messages are included in the on hold "music" messages on all DC Water phone lines and in presentations at Town Hall meetings, civic meetings, club and homeowners meetings.

Environmental groups also receive direct mail pieces and DC Water participates in many of these groups' special events and celebrations, as well as awards ceremonies.

In addition, DC Water worked with Free Range Studios to create an animated cartoon explaining the project. The educational video, called *A Drop's Life*, targeted children and those without a high school degree. Using animation and humor, DC Water effectively conveyed the impact of urban stormwater pollution and the environmental benefits of this project. The DC Water outreach team created a new environmental education curriculum for school-aged students to incorporate the 4 ½-minute *A Drop's Life* video. Principals, teachers, environmentalists, parents, and other stakeholders helped to advance outreach efforts and build public awareness by allowing the outreach team to facilitate the *A Drop's Life* curriculum at numerous schools and children-focused events across the District of Columbia. The total budget of producing the education video was $75,000.

DC Water has been communicating about this project since before the consent decree was signed in 2005, but OEA ramped up communications with the media in advance of the groundbreaking for the Clean Rivers Project. The OEA gave a soft pitch during its May groundbreaking for two other massive environmental projects on the grounds of the Blue Plains Advanced Wastewater Treatment Plant. Media relations representatives continued to pitch the story throughout the summer and leading up to the October 12, 2011 groundbreaking for the Clean Rivers Project. About 100 people, and most local media, attended the groundbreaking. An impressive range of speakers included US Senator Benjamin Cardin, US Congresswoman Eleanor Holmes Norton, DC Mayor Vincent Gray, US EPA Region 3 Administrator Sean Garvin, DDOE Director Christophe Tulou and DC Councilmember Thomas.

DC Water partnered with Free Range Studios to develop an educational video, called *A Drop's Life*, targeting children (primary audience). Using age-appropriate animation and humor, DC Water was able to effectively convey the impact of urban stormwater pollution and the environmental benefits of this project with the video. The DC Water outreach team created a new environmental education curriculum for school-aged students to incorporate the 4 ½-minute *A Drop's Life* video. Principals, teachers, environmentalists, parents, and stakeholders (secondary target audience) helped to advance outreach efforts and build public awareness by allowing the outreach team to facilitate the *A Drop's Life* curriculum at numerous schools and children-focused events across the District of Columbia.

Results

DC Water's communication campaign and press conference garnered local, regional and international attention. The press release was distributed over PR Newswire and was picked up by websites from Yahoo and Google to environmental sites and local affiliates of television networks. There were 14.7 million impressions worldwide in the first week. More important to our goals (and target audience), the local and regional coverage was positive and abundant. The Washington Post ran a Metro-section cover story by environmental reporter David Farenthold on November 11. Other media results are listed on the results page and included as hyperlinks or .pdf files.

DC Water gave presentations at dozens of community meetings and for members of the local government. A short listing is included in the results page. Anecdotally, the response has been positive.

More than 12,000 people have viewed *A Drop's Life* video since its release in April 2011. The video generated significant interest among educators, environmentalists and other stakeholders, which resulted in increased requests for environmental education presentations and workshops that incorporated *A Drop's Life* video. DC Water outreach team facilitated environmental education activities and programs to approximately 300 students in area schools. Additionally, DC Water displayed the video at various public meetings, creating dialogue, increasing awareness, and positioning DC Water as an innovative, leading environmental steward that recognizes the value in public engagement.

Honor Award

Entrant: CH2M HILL

Person in Charge: Kate Peabody

Access Water

CH2M HILL Access Water is an ongoing program, launched in late 2009 by the CH2M HILL Water Business Group (WBG) Marketing and Communications (MarCom) team, designed to provide innovation and insight on all things water all year long." The main components of the program are blogs, pages, videos, and a quarterly client newsletter found on Access Water (www.ch2mhillblogs.com/water).

Challenges to Address and Value Proposition/Goals

In 2009, based on solicited feedback from both WBG clients and employees, the WBG MarCom team developed a communications plan that would allow for the additional people, project, community, and industry trend stories that employees were looking to be shared, as well as would improve CH2M HILL's "all things water" brand and communications with current and potential clients, university students, and the industry at large. From this planning, Access Water was developed.

For CH2M HILL, Access Water was designed to:

- Enhance the reputation and recognition of CH2M HILL as a total water company with the ultimate industry experts and technology.
- Showcase thought leadership, share passion for the business, and put personalities to the CH2M HILL water brand.
- Share our employees' community investment and outreach activities.
- Engage with clients, employees, and members of the industry in an ongoing, informal manner.
- Increase and streamline client communications.
- Support project positioning.
- Support recruiting efforts.

For our audience, Access Water was designed to:

- Act as an information filter and provide valuable insight, research, resources, and examples of current trends, new technologies, risks and opportunities to look out for, changing regulations, financial options, upgrades, what other communities are doing, etc.
- Enhance CH2M HILL's credibility and culture, and their decision (or future decision) to hire and work with us; why we are good to partner with; contractor analysis.

Target Audience

- Current and potential clients – Municipal water/wastewater and industrial
- Current and potential employees
- Water and environment industry at large
- University students
- Media and trade press

Ongoing Objectives and Strategies

Access Water was launched internally in late 2009 with the Access Water videos with great results and feedback. The Access Water Blog was launched in June 2010.

Gaining Authors

As social media was still rather new to the industry in 2009, the team began by re-purposing existing communications pieces and employee generated content, and continually reached out to our experts. Blogs were reposted across all internal and external communication channels, including social media, and presentations were given to WBG technology groups about why we are active in social media and how they could participate and help promote. Today we have a reliable stream of blog materials being sent to the team for posting, meeting the goal to post at least one blog a week.

Thought Leadership

There are a number of groups and individuals who have embraced and contribute their voice to Access Water regularly, for example:

- Dr. Glen Daigger, International Water Association President and CH2M HILL Senior Vice President and Chief Technology Officer, blogs regularly as he travels the world for work in the industry.
- CH2M HILL's Water Sustainability Initiative Coordinators provide one post a month.

Building a Following

In addition to sharing blogs on all existing internal and external communication channels, URLs were added to email signature lines, "business cards" handed out at industry conferences, and all WBG marketing and communications materials. Quiz games were also held at conference booths based on recent Access Water blog content. The quarterly client newsletter, hosted on Access Water, is sent directly to clients via a link in an email.

At about 13 months, search engine optimization began to kick-in, and new readers began to find Access Water based on search engine queries on a variety of topics – ranging from natural treatment systems to climate change to desalination trends to sustainability topics and more.

Results

As of March 1, 2012 (22 months old), 191 blog posts, with 108 comments, have been posted on Access Water.

The Access Water blog continues to grow in popularity and readership, as seen in the latest analytics as well as in the increasing number of comments, shares and likes on social networks, and employees who proactively reach out to author a blog. While our regular readership doesn't necessarily read every week, when they do visit they spend time reading the information and read multiple blogs and look at multiple pages.

Clients have followed up with future business opportunities for CH2M HILL after reading a project highlight in the Access Water client newsletter, and multiple editorial opportunities have resulted from journalists following up on projects featured in blogs. The blog has also proven to help staff with career growth and development opportunities.

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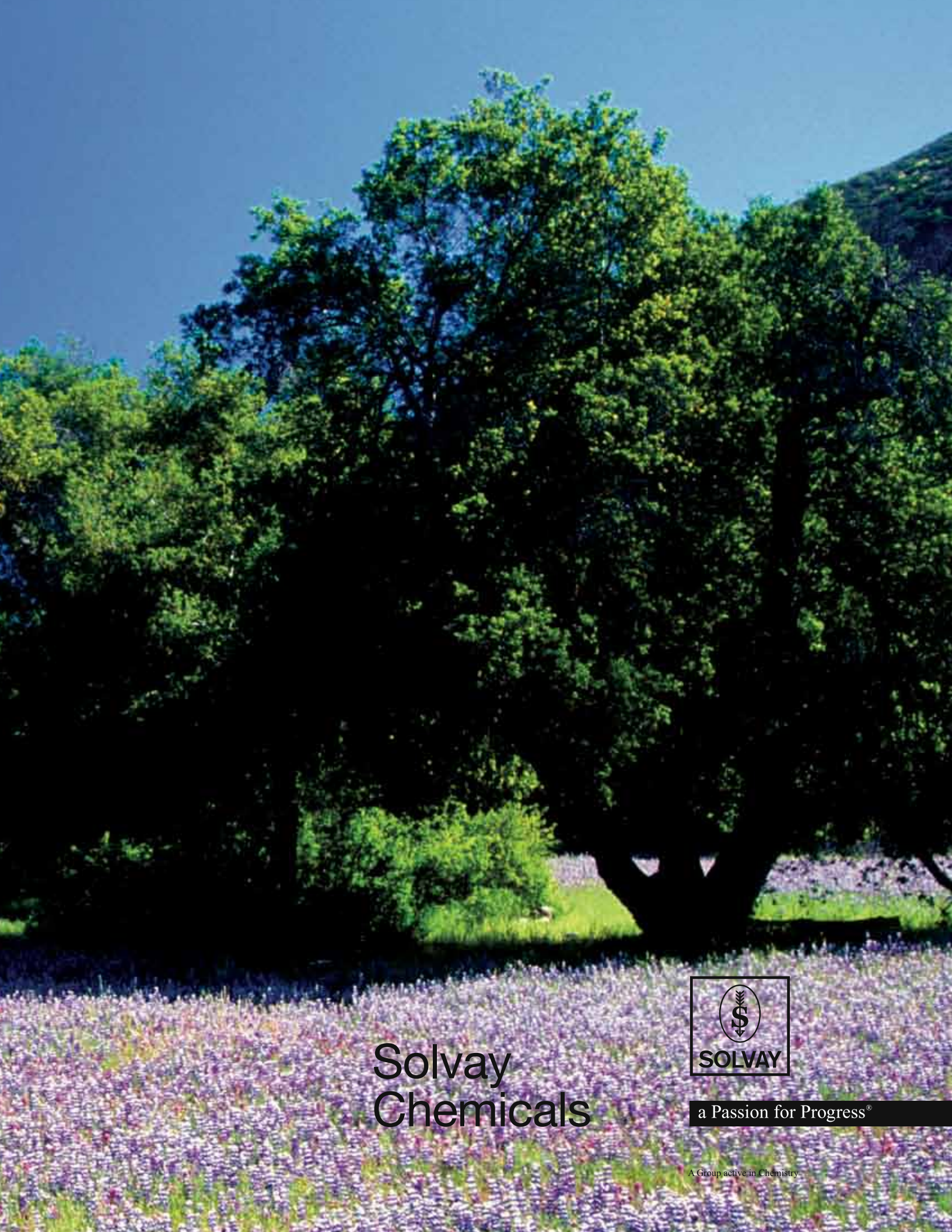

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2012

The Excellence in Environmental Engineering® (E3) Competition of the American Academy of Environmental Engineers seeks to identify, reward, and promote projects which typify quality in all facets of environmental engineering practice. Since being launched in 1989, the E3 competition has singled out projects and programs for recognition which testify to the genius of mankind and demonstrate a commitment to quality, comprehensive, and revolutionary solutions to real-world problems which improve human life and the environments they serve.

Twenty-five qualifying entries were submitted for the 2012 E3 Competition. Entries were received in Research, University Research, Planning, Small Projects, Design, Small Firms, Operations/Management, Environmental Sustainability, and E3's newest category, Industrial Waste Practice.

Each entry is judged based on five criteria:

- Demonstration of a comprehensive, integrated approach to the problem which considers all environmental media (i.e., air, water and land) in its solution.
- Quality as evidenced by the degree of user satisfaction and proven performance as established by written documentation.
- Originality and innovation, representing the application of new knowledge, a new application of existing knowledge or an innovative mix of old and new knowledge.
- The complexity of the problem or situation addressed.
- The extent the project contributes to or offers the prospect of contributing to social and economic advancement.

Using that criteria, an independent panel of judges thoroughly reviewed and analyzed each project. The judges awarded 18 awards: 1 Superior Achievement, 9 Grand Prizes, and 8 Honor Awards. Profiles of the winning entries are on the following pages. To view full profiles of the winning entries, visit www.aaee.net and click on Excellence in Environmental Engineering Competition.

AAEE would like to thank the 2012 panel of judges for their time and expertise in analyzing the 2012 Excellence in Environmental Engineering Competition entries. They are:

William J. Celenza, P.E., BCEE
Rao Chitikela, Ph.D., P.E., BCEE
Jim Condon, P.E., BCEE
Nick Cooper, P.E., BCEE
Tapas K. Das, Ph.D., P.E., BCEE
Matthew Dominy, P.E., BCEE
Douglas H. Eckmann, P.E., BCEE
Thomas Gillogly, Ph.D., P.E.
John S. Hadfield, P.E., BCEE
Jay M. Herskowitz, P.E., BCEE
Ashok Kumar, Ph.D., P.E., BCEE
Nancy J. Manley, P.E., D.WRE, BCEE
Colin McKenna, P.E., BCEE
John T. Morris, P.E., BCEE
Webster J. Owen, Jr., P.E., BCEE
Gary Rabalais, P.E., BCEE
Michael A. Sevener, P.E., BCEE
James R. Sheetz, P.E., BCEE
Jerry K. Snyder, P.E., DEE
Jay M.K. Stone, P.E., BCEE
Ram Tewari, Ph.D., P.E., BCEE
Kevin Torrens, P.E., BCEEM
Robert C. Williams, Ph.D., P.E, BCEE









Superior Achievement

ENTRANT: PEER Consultants, PC/PEER Africa (pty) Ltd.
ENGINEER IN CHARGE: Lilia A. Abron, Ph.D., P.E., BCEE
LOCATION: Atlantis, Cape Town South Africa

"A primary aim of the housing strategy must be to build not just houses, but viable and sustainable communities."
President Nelson Mandela

Witsand iEEECO™ (integrated energy environment empowerment-cost optimization) Sustainable Human Settlement

The Witsand Sustainable Human Settlement is one of the few low-cost housing projects in South Africa that has realized a primary aim of the housing strategy set forth in the 1994 South African Reconstruction and Development Programs.

This new iEEECO™ methodology developed by PEER Africa, incorporates all elements of an integrated, viable community. iEEECO™ is a set of procedures that produce viable sustainability communities out of the rubble of shanty towns that primarily depend on the informal economy. The success of the methodology has been demonstrated and proven by a multidisciplinary team of South African stakeholders and end-use beneficiaries. The measured, performance-based, outcomes have received recognition and commendation from the United Nations Framework Convention on Climate Change, The Global Environmental Facility, and the United Nations Environmental Programme (UNEP). The Witsand Human Settlement is the recipient of the Eskom eta Award in residential energy, and was given the distinction of a "Flagship Project" by the South African Government Department of Energy and showcased at the 2011 Climate Summit in Durban.

The Witsand Sustainable Human Settlement was a 20 year-old shantytown consisting of about 2,000 shacks. Living conditions were deplorable. Potable water, accessible only by water hydrants not close to the shacks, and ablution and toilet facilities built by the apartheid government, were inadequate, few in number, and not secure. There was no electrical grid in the area, thus energy for space heating, water heating, bathing, and cooking was provided through the use of open flames with the fuel of choice being paraffin (kerosene).

The settlement is planned to accommodate over 2,600 families in single-family, multifamily, and mixed-use passive-solar designed homes, equipped with energy efficient and water conserving appliances and fixtures. Standard municipal infrastructure is included in the town plan as well as storm water best-management practices and community gardens.

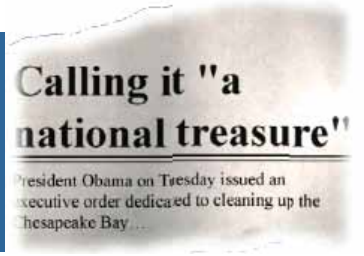
Solar thermal water heating units are now standard on all homes, and an affordable line of safe cookstoves, low-energy using appliances, and solar energy products, such as roof-top cell phone charging units, are being made available to the new home owners. A mini-grid using a hybrid PV and wind power generation station is piloted for future expansion to the entire settlement.

The Witsand Sustainable Human Settlement is a living demonstration project for how to incorporate appropriate technology and modern ideas about communities as places to live and work for the improvement and enhancement of the well being of the human environment.

1. While PEER Africa and the project team have made huge strides in transforming Witsand to a sustainable human settlement, there is still much to do and many more complexities that are social, political, and environmental. This is the first fully operational sustainable human settlement in South Africa built by the people for themselves.
2. PEER Africa Mothusi Guy explaining to Dr. Jigar Shah of the IFC the iEEECO sustainable town plan for Witsand. Plan calls for 2,600 passive-solar homes equipped with energy efficient, water conserving appliances and fixtures, modern community infrastructure, nonpolluting street lighting, stormwater BMPs and community gardens.

Grand Prize - Research

Entrant: DC Water & AECOM
Engineer in Charge: Walter Bailey, P.E., DEE
Location: Washington, DC


Calling it "a national treasure"

President Obama on Tuesday issued an executive order dedicated to cleaning up the Chesapeake Bay...

DC Water Advances the Frontiers on the Road to Energy Neutrality at a Large Enhanced Nutrient Removal Plant


1

2

The District of Columbia Water and Sewer Authority (DC Water) and AECOM have completed an extensive engineering and applied research program to identify and develop novel treatment concepts and cutting-edge technologies with the goal of implementing a truly sustainable and affordable nutrient removal wastewater treatment plant. While nutrient removal from wastewater is recognized as a critical mission for the protection of the environment and receiving waters, it is not without its challenges from the perspective of increased energy, chemical, space, and cost demands, all of which contribute to an increased carbon footprint and greenhouse gas emissions.

These issues were of paramount concern to DC Water as it embarked on its Enhanced Nutrient Removal (ENR) project at the largest plant in the Chesapeake Bay, the 370 mgd Blue Plains Advanced Wastewater Treatment Plant (AWTP). DC Water and AECOM had a vision of overcoming the challenges and set a goal of achieving stringent wastewater and biosolids treatment standards, while also moving toward energy neutrality, reducing chemicals and greenhouse gas emissions, and controlling costs for the ratepayers. In short, a vision of an environmentally, economically, and socially sustainable enhanced nutrient removal plant; a vision that the wastewater industry covets but has yet to achieve.

Over the past five years, DC Water brought together a global team of scientists, researchers and engineering practitioners (from AECOM, University of lnnsbruck, Bucknell University, ASA Consult and Strass WWTP in Austria) to support this effort. The key to success lay in integrating two novel treatment processes, the CAMBI-MAD system (for energy recovery) and the DEMON filtrate treatment system (for nutrient removal) and in overcoming the inhibitory effects of one on the other. This has never been accomplished before at any location in the world. This research team successfully developed a scientifically rigorous and practical approach by which to overcome the inhibition of the CAMBI filtrate on the novel ANAMMOX bacteria and ammonia oxidizing bacteria in the DEMON process. This resulted in a robust treatment process that operates with a 60 percent reduction in energy demand and a 90 percent reduction in chemical demand to more economically accomplish nitrogen removal at a wastewater treatment plant in a smaller footprint while also significantly reducing GHG emissions.

This research represents a watershed for the engineering community as it overcomes critical scientific and engineering barriers and provides a practical and robust technical road map by which wastewater treatment plants can move toward energy neutrality and sustainable nutrient removal while controlling costs for their ratepayers.

1. Aerial photo of the Blue Plains Advanced Wastewater Treatment Plant
   - Largest advanced wastewater treatment plant in the world
     - 390 mgd AAF / 1,076 mgd Peak
   - 8 time winner of NACWA Gold Peak Performance Award
   - $1.2 Billion Upgrade Program Underway for:
     - Enhanced Nutrient Removal - TN < 3 mg/l, TP < 0.18 mg/l
     - Wet Weather Flow Management & CSOs reduction
     - Biosolids Upgrade to Class A & energy recovery
2. Aerial Map of Blue Plains showing the footprint required to treat 105,000 lbs/day of nitrogen using the conventional approach in mainstream (outlined in BLUE) and the significantly smaller footprint required to treat almost 20% of the plant nitrogen load using the DEMON process while using less energy and chemicals (outlined in RED).

Honor Award - Research

Entrant: US Environmental Protection Agency
Engineer in Charge: Thomas J. Sorg, P.E., BCEE
Location: Cincinnati, Ohio

Arsenic Demonstration Program

When the EPA Administrator announced the final revised standard for arsenic in drinking water of 10 parts per billion in 2001, the Administrator pledged to provide a research and development program on cost-effective technologies for small systems to help reduce compliance costs. The Office of Research and Development was assigned the responsibility for leading the research program. The major component of the program was the Arsenic Demonstration Program. EPA funded the Program to reduce the financial risk of the small systems with their limited resources having to select and purchase a new, unproven technology with little or no performance or cost information available to them.

The Arsenic Demonstration Program officially ended on September 30, 2011. The program consisted of 50 demonstration projects in 26 different states on commercially available, full scale treatment technologies operating under a variety of conditions. Part of the complexity of the program was the number of projects that involved 50 water systems, 26 state agencies, and 14 different equipment vendors. Recognizing that the new arsenic rule would be an economic burden to small water systems, the program was specifically geared at demonstrating effective, low cost technologies.

Brown City, MI - Open House. Photo of the tent meeting with attendees on the new arsenic removal treatment system. Presentations made by vendor, State of MI, and USEPA on the design and operation of the system for interested water utilities in northeast, MI, followed by a tour of the facility.

Each project consisted of selecting, installing, and evaluating the performance of a full-scale arsenic removal system. Seventy-seventy reports have been developed from the information produced by the demonstration projects, each providing detailed information of the performance and cost of the treatment system and includes raw data in the appendences. Copies of all of the reports can be found at: http://epa.gov/nrmrl/wswrd/dw/arsenic/publications.html

The performance and cost information developed from the Arsenic Demonstration Program is considered the most comprehensive set of research data that has ever been collected on drinking water treatment technologies design for a specific problem.

Honor Award - Planning

Entrant: CH2M HILL
Engineer in Charge: Brian Skeens, P.E.
Location: Atlanta, Georgia

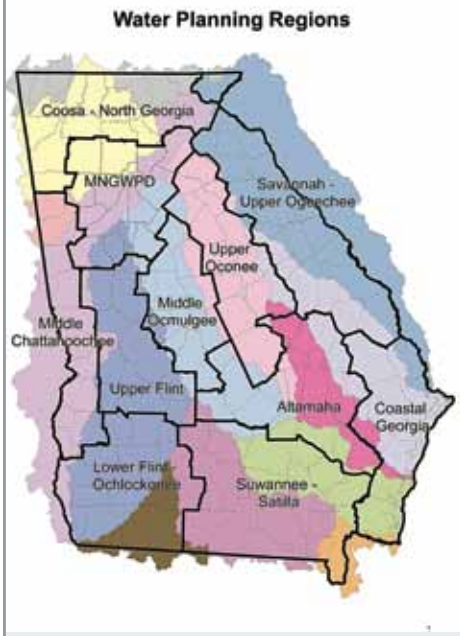
Regional Water Planning in Georgia

The Georgia Environmental Protection Division has completed an innovative water planning project that was conducted jointly by consulting firms AECOM, ARCADIS, Black & Veatch, CDM, CH2M HILL, Jacobs, and Tetra Tech. The comprehensive project represents the single largest investment in water knowledge in the past 20 years for the state. It also is the first attempt by a state on the East Coast to develop a river basin and aquifer resources-based water planning effort.

The consulting team's technical expertise and demonstrated ability to collaborate helped the state develop a range of new models and significantly enhanced EPD's modeling capacity to assess surface water quantity and quality conditions, as well as groundwater aquifer availability.

The Georgia EPD embarked on the regional water planning effort under the directive of the 2004 Comprehensive Water Planning Act and the 2008 State Water Plan. Ten Regional Water Planning Councils were established, along with the Metropolitan North Georgia Water Planning District, to examine and develop technical information about the state's water resources, refine water use forecasts, and compare those forecasts to expected demands.

Most councils held at least 10 meetings throughout the course of their plan's preparation. The results of the councils' studies are a set of regional water plans that represents a new and integral part of the overall framework for sustainable water management for Georgia residents through 2050. The plans provide practical approaches that are generated by each region to guide state agency decisions on water permits and on grants and loans for water-related projects.



Regional water planning regions were identified based on watersheds, to facilitate water resource management and planning.

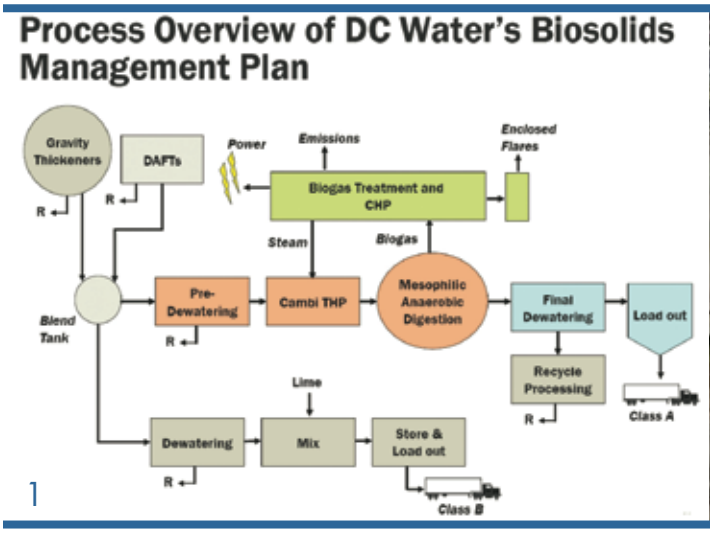
Grand Prize - Planning

Entrant: Brown and Caldwell

Engineer in Charge: Perry Schafer, P.E., BCEE

Location: Washington, DC

DC Water Biosolids Program



Brown and Caldwell has planned and developed DC Water's innovative $450 million biosolids program at the Blue Plains Advanced Wastewater Treatment Plant.

The plan, called the DC Water Biosolids Program, is a $400 million program that integrates multiple technical, environmental, and economic strategies to dramatically transform the way in which wastewater solids are processed at Blue Plains and managed within the Eastern United States, while protecting and improving the Potomac River and Chesapeake Bay watersheds. The result will be higher quality Class A biosolids with multiple reuse options, lower overall quantities of biosolids that will reduce hauling and disposal costs and impacts, enhanced power generation, and lower GHG emissions - all in all, saving the utility some $25 million per year in operating costs.

Blue Plains, the largest advanced wastewater treatment plant in the world at 370 mgd, treats 1,200 wet tons per day and provides wastewater collection and treatment services to more than two million customers in the Metropolitan Washington, D.C., area. The Biosolids Program is a long-term effort focused on recycling nutrients and organic material in an environmentally safe and beneficial manner.

DC Water spent more than 10 years examining solutions that would significantly reduce the amount of biosolids, improve product characteristics, and be cost- and energy-efficient. The evaluation included examining previous research and testing, as well as a review of evolving technologies which included thermal hydrolysis (as pretreatment for anaerobic digestion) and other anaerobic digestion approaches that could produce Class A biosolids. Utility managers visited and tested facilities in Europe and the United Kingdom to confirm system "unknowns," which included product dewatering performance as well as product odor and regrowth potential after dewatering.

After extensive due diligence on the Cambi Thermal Hydrolysis Process, the team determined that this process (from Norway) could be implemented successfully in the United States as the world's largest installation of thermal hydrolysis. Using more efficient combustion and energy recovery methods for handling digester methane maximized the economic gains of the DC Water program.

The Cambi™ process cuts digester capacity needs in half while producing Class A biosolids. The new digestion/energy system, using new combustion turbine technology, will generate 13 MW of green, renewable power to supply more than one third of the plant's power needs and reduce greenhouse gas emissions by about 40 percent. This new system essentially pays for itself by reducing biosolids volumes, generating renewable power, and reducing operating and maintenance costs. The plan calls for no cost increases for ratepayers.

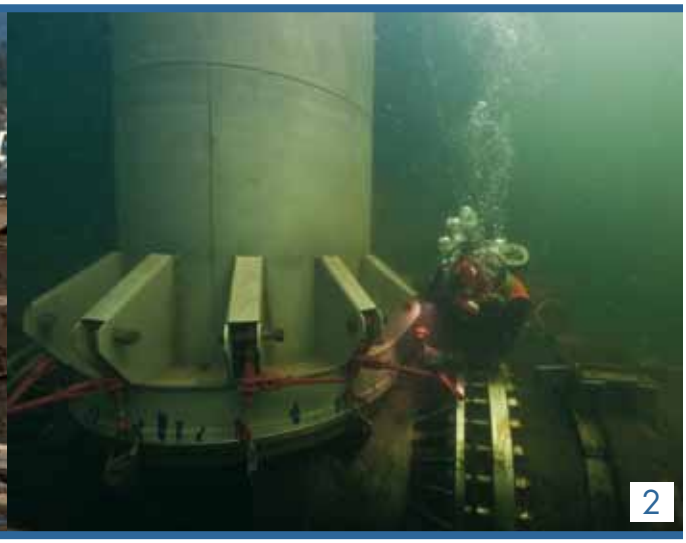
1. Significant plant improvements under the Biosolids Management Plan include: construction of a main process train that incorporates pre-dewatering, thermal hydrolysis and anaerobic digestion and includes four anaerobic digesters, four Cambi™ treatment trains, and a pre-watering centrifuge building containing 10 new centrifuges; construction of a new final dewatering building for the Class A biosolids using belt filter presses; and construction of a combined heat and power (CHP) project that will generate reliable electrical power and produce 185 pounds per square inch gauge (psig) steam to support the THP. The new combined heat and power facility includes biogas condition equipment and gas compressors.
2. This picture, taken in January 2012, shows the primary construction site of the new DC Water Biosolids Program facilities. The site preparation included earthwork necessary to restore surface grades to elevation more than 14 feet in the area required. The photo captures the completion of the $6 million Site Preparation Contract at the Blue PLains AWTP, making the site ready for major construction activity which will begin in February 2012.

Grand Prize - Design

ENTRANT: Brown and Caldwell
ENGINEER IN CHARGE: Jonathan R. Holland, P.E.
LOCATION: Lake Oswego, Oregon

Lake Oswego Inteceptor Sewer


1


2

Faced with an aging, undersized, and earthquake-vulnerable sewer pipe, the City of Lake Oswego and Brown and Caldwell put their creative minds together to devise an incredibly elegant solution: the first-known buoyant gravity sewer in the world.

Brown and Caldwell served as lead design consultant and construction manager for the five contract packages that make up the Lake Oswego Interceptor Sewer program and performed much of the engineering design work, coordinated all other design work, and oversaw construction to ensure compliance with contract terms and project objectives. Working closely with the City of Lake Oswego, the project was delivered on schedule, under budget, and with broad public support. The planning phase included analysis of the in-lake buoyant and pile-supported options; development of an around-the-lake pumping alternative; and extensive dialog with the public, elected officials, and lake owners.

The centerpiece of the sewer system is a nearly two-mile reach of buoyant high-density polyethylene (HDPE) gravity sewer held to proper grade safely beneath the lake surface. Unlike concrete, HDPE is flexible, tough, and inherently resists corrosion, a common problem in sewer systems. Brown and Caldwell engineers purposely designed the pipeline in a serpentine layout across the lake to accommodate expansion and contraction, and maintain its uniform gradual downward slope during seasonal water temperature changes.


3

The buoyant gravity sewer, designed for a 100-year lifespan, is a robust, flexible system that moves freely during an earthquake, meeting modern seismic design standards.

The sewer also features buoyant submerged stainless steel manholes that utility workers can enter through removable, lightweight aluminum caissons.

Because the project was highly visible in the heart of Lake Oswego, every effort was taken to ensure a positive experience by city residents. An extensive public outreach campaign was executed with positive results. The project team hosted countless public meetings, instituted a hotline, launched a website (www.loisnews.com), produced several documentary video "webisodes", and established a media presence on Facebook, Twitter, and YouTube.

Brown and Caldwell and the city developed "good neighbor guidelines" to develop a cooperative relationship with citizens, be responsible with scheduling and budgeting, develop construction contract requirements that addressed quality-of-life issues for neighbors, avoid surprises, and encourage communication.

1. The water surface level of Oswego Lake was lowered 24 feet as part of the lake drawdown phase of the project. Lake drawdown enabled the contractor to conduct work in the dry and prevent turbidity issues when excavating for pile cutoffs or construction of junction structures between exist- ing and new pipelines.
2. A diver attaches a removable caisson to one of the submerged, buoyant, stainless steel manholes, providing temporary access to the sewer system from above the water surface.
3. The submerged, buoyant pipeline consists of ground anchors, wire rope tethers and inter- nodal cables, tether brackets, buoyancy pipes, sewer pipe in a sine wave alignment, and submerged manholes as shown in this artist's rendering.

Honor Award - Design

Entrant: Bioengineering ARCADIS, LLC
Engineer in Charge: Wayne Welch, P.E.
Location: New Orleans, Louisiana

Gulf Intracoastal Waterway, West Closure Complex Pump Station

The WCC Pump Station is a truly unique structure. It is longer than two football fields, and over 100 feet high. When the sector gate is closed in advance of an impending storm, the pump station will prevent substantial flooding in the West Bank area by discharging upstream drainage to the flood side of the barrier.

The West Closure Pump Station, the world's largest stormwater pump station and a cornerstone of the $1.5 billion Gulf Coast Intracoastal Waterway West Closure Complex, was operational in time for the 2011 hurricane season. Engineered by the joint venture of Bioengineering ARCADIS LLC, the project fulfills Congress's mandate to the U.S. Army Corps of Engineers to provide added flood protection for high-risk areas of New Orleans and surrounding parishes areas hard-hit in 2005 by Hurricane Katrina.

The $350 million pump station is designed to withstand Category Five hurricane force winds and can pump enough storm runoff over the closure barrier to fill an Olympic-sized swimming pool in 21 seconds. When the sector gate is closed ahead of an upcoming storm, the pump station will prevent substantial flooding in West Bank communities. The pump station provides significant risk reduction from storm surge for the highly-industrialized West Bank area, home to nearly 250,000 residents, as well as businesses and industries critical to the national defense. With the entire complex designed to allow continued use of the GIWW, except during extreme storms, the project's impact on river-borne commerce and industry was minimized.

Multiple Corps Districts participated in the project design, a Corps "first" for a project of this enormity. Early procurement of long-lead time items such as pumps, engines and generators helped the team construct the project in about one-third of the normal time. Completed on schedule ahead of the 2011 hurricane season, the pump station is a trustworthy component of the region's new hurricane risk reduction system.

Honor Award - Design

Entrant: CH2M HILL/Brown and Caldwell Team
Engineer in Charge: Patrick Burke, P.E.
Location: Seattle, Washington

Brightwater Treatment Plant

Brightwater has redefined the municipal wastewater treatment plant and is setting standards of practice for wastewater treatment and reclamation around the country.

The Brightwater Treatment Plant integrates technical innovation, sustainable solutions, and educational opportunities to redefine society's views of what a wastewater treatment plant should be. The state-of-the-art advanced wastewater treatment and reclamation facility will serve an equivalent population of 510,000 residential, commercial, and industrial users in the northern King County and South Snohomish County. CH2M HILL and Brown and Caldwell formed a team to deliver Brightwater in a nine-year partnership with King County and subconsultant firms. CDM Smith served as King County's construction management consultant.

The system's innovative design will allow this treatment facility to keep up with population growth, lifecycle costs, and operational malfunctions. Brightwater Treatment Plant features a 39 mgd membrane bioreactor, the largest in North America, and has the ability to split flows for treatment during peak storm events. The odor control design combines fully enclosed facilities with a three-stage odor control system to meet the public's requirement for odor elimination. Complete automation of systems across the plant reduces operational costs and allows for unattended, remote operation, if necessary.

Reclaimed water is used onsite for landscape irrigation, toilet and urinal flushing, and a water feature as well as, offsite, for irrigation and cooling. Large windows provide natural light that create well-lit and safe working spaces while reducing the electrical demands of the treatment plant.

The 120-acre treatment plant site is a community asset and has been transformed into a park-like area incorporating 40 acres of streams and wetlands, three miles of walking trails, overlook structures, and the Brightwater Center, a Leadership in Energy and Environmental Design Platinum-designed environmental education and community center with a public meeting space, areas for interpretive displays, and teaching and laboratory facilities.

Grand Prize - Operations/Management

ENTRANT: Sanitation Districts of Los Angeles County
ENGINEER IN CHARGE: Grace R. Chan, P.E., BCEE
LOCATION: Whittier, California

Innovative Energy Management Proves that It Pays to Be Green

The Sanitation Districts of Los Angeles County (Districts) have saved $33 million over the past two years through its energy management program that included development of renewal biogas resources, minimization of energy usage, and minimization of energy cost.

The savings include $24 million from self-generation through biogas resources at the Joint Water Pollution Control Plant (JWPCP) located in Carson. Renewable biogas resources are developed at seven of the Districts' eleven wastewater treatment plants that comprise the Joint Outfall System. Six of these seven plants are water reclamation plants (WRPs) that treat liquid streams only and discharge solids into the sewer for treatment downstream at the seventh and main plant, JWPCP. Central solids processing at JWPCP greatly increases the energy efficiency of solids treatment and helps produce enough digester gas to generate power for the entire plant's needs. This contributes to the low average energy usage rate of 1,520 kWh per million gallons (MG) for plants in the Joint Outfall System. This is well below California's prototypical wastewater treatment energy intensity of 2,500 kWh per million gallons.

The second way in which the savings are derived is through the integration of energy efficiency into the design of new treatment systems. The in-house design staff takes special care to ensure that the most cost-effective and energy efficient treatment processes are included into the design of new facilities. In addition, the Districts constantly seek to improve the efficiency of its treatment processes through the installation of new energy efficient technology throughout the wastewater system. Savings also were earned through the minimization of energy costs. Where power is needed from the grid, the Districts purchase it from a third-party electric service provider through the Direct Access program rather than from the regional electric utility. In the past two years, the Districts have purchased 215 GWh of electricity via Direct Access at a savings of over $2 million compared to standard utility rates.

Rebate incentives through regional electric utilities help to incentivize energy efficiency improvements. In the past two years, the Districts received $1.3 million in energy efficiency rebate incentives for the Lancaster, Palmdale, and Whittier Narrows WRP projects.

The Districts' Energy Management Program is an environmentally sound and cost-effective approach to the operation and management of its wastewater treatment facilities. These multi-faceted energy management efforts have increased the reliability of the Districts' treatment systems and made positive impacts on the environment, all while saving the agency many millions in ratepayer funds.

1. Map of wastewater treatment facilities within the Sanitation Districts' service area, including the layout of the Joint Outfall System (JOS). The arrangement of the JOS creates a very efficient network of water reclamation plants that produce 135 mgd of recycled water with centralized solids treatment and energy production at JWPCP.
2. The Total Energy Facility located at the JWPCP in Carson is a combined cycle power plant. Three 9.9 MW gas turbines burn digester gas to directly generate electricity. The exhaust heat is utilized to heat digesters and to make steam that powers an 8.7 MW steam turbine generator. Known as cogeneration or combined heat and power, the upgraded facility has capacity for 38 MW and is expected to generate 23 MW on average, enough energy for all JWPCP operations and more.

Honor Award - Operations/Management

Entrant: Malcolm Pirnie in association with Stantec and H.R. Gray
Engineer in Charge: Cosmo A. Bertino, P.E., BCEE
Location: Columbus, Ohio

Columbus Professional Program Management

Construction is complete on $430 million in improvements at Columbus' Southerly and Jackson Pike Wastewater Treatment Plants (WWTPs) - the keystone of Project Clean Rivers, the city's comprehensive $2.5 billion wet-weather management program. Before implementation of Project Clean Rivers, sewage overflows from the city's aging sanitary and combined sewer systems after heavy rainfall events caused significant pollution in the Scioto and Olentangy Rivers. This massive project will have an enormous, positive impact on the environment and public health by improving water quality in local rivers, reducing sewer backups into homes and businesses, and ultimately building a better, healthier, and greener Columbus.

With an aggressive July 2010 deadline mandated by the Ohio EPA for plant improvements, city leaders turned to Malcolm Pirnie, the Water Division of ARCADIS (Pirnie/ARCADIS), in association with Stantec and H.R. Gray, to serve as the city's Professional Program Manager (PPM). Planning and executing two projects of such extraordinary scope, scale, and urgency in a tight timeframe all while maintaining uninterrupted wastewater treatment during construction, was a daunting challenge. To achieve city goals, Pirnie/ARCADIS assembled a strong, experienced team of consultants with outstanding technical and managerial capabilities and local knowledge. The team also included over 30 percent participation by minority- and women-owned business enterprises.

The improvements at the Southerly and Jackson Pike WWTPs increased the combined wet-weather treatment capacity of both plants by more than 50 percent, from 300 to 480 million gallons per day. As a result, overflows of untreated sewage will be decreased by over a billion gallons annually, reducing wet-weather overflows in the downtown area and basement backups in homes and businesses, as well as improving the quality of life for more than 1.5 million residents in the Columbus Metropolitan Area.

Reducing sewer overflows by over a billion gallons annually will substantially improve water quality in the Scioto and Olentangy Rivers. The economic impacts of the project, both direct and indirect, were significant, including increased production and earnings of private businesses, additional jobs and subsequent tax revenues - some 1,200 construction jobs and 680 consulting jobs were created.

Honor Award - University Research

Entrant: University of Kansas
Engineer in Charge: Stacey L. Lamer, P.E., BCEE
Location: Lawrence, Kansas

Coupling Algal Biomass Production with Wastewater Nutrient Removal

Dr. Belinda Sturm recently led the effort of piloting algal bioreactors at the City of Lawrence, Kansas, municipal wastewater treatment plant (WWTP). As part of her graduate research studies, Stacey Lamer of Bartlett & West, Inc., worked with Dr. Sturm to study the energetic viability of growing and dewatering algal biomass in a municipal wastewater effluent medium for the production of a combustible biosource. A pilot-scale algal dewatering unit was designed and constructed by CDI Industrial and Mechanical Contractors for future research on gravity sedimentation, chemical coagulation and flocculation, dissolved air flotation, and return/waste algal rates.

Algae have been investigated as a biofuel source for more than two decades due to high lipid content, rapid growth rate, and ability to sequester atmospheric or waste carbon dioxide. Unlike other biofuel feedstocks, algae can grow on marginal lands not suitable for conventional agriculture, do not compete with existing food commodities, and do not require large volumes of fresh water. Additionally, algae may reduce nutrient loads to receiving water bodies by performing nitrogen and phosphorus removal when grown in nutrient-rich wastewaters.

Outdoor algal reactors were operated at the City of Lawrence WWTP. The wastewater effluent from a WWTP was used as a nutrient feedstock for the production of algal solids which has environmental and economic benefits. The uptake of nutrients by the algal growth provides biological nutrient removal (BNR), a process likely to be a requirement in the near future.

Overall, the results show that algal biofuel production is energetically favorable for open-pond reactors utilizing wastewater as a nutrient source. In addition to BNR, there are several processes in WWTP that can be coupled to algal biomass production to improve the energy balance and to lessen the environmental footprint of WWTP, particularly carbon dioxide and heat recovery from biogas combustion.

Algal dewatering unit designed by Dr. Belinda Sturm and Stacey Lamer, Bartlett & West, Inc. and constructed by CDI Contractors, Kansas City, Kansas.

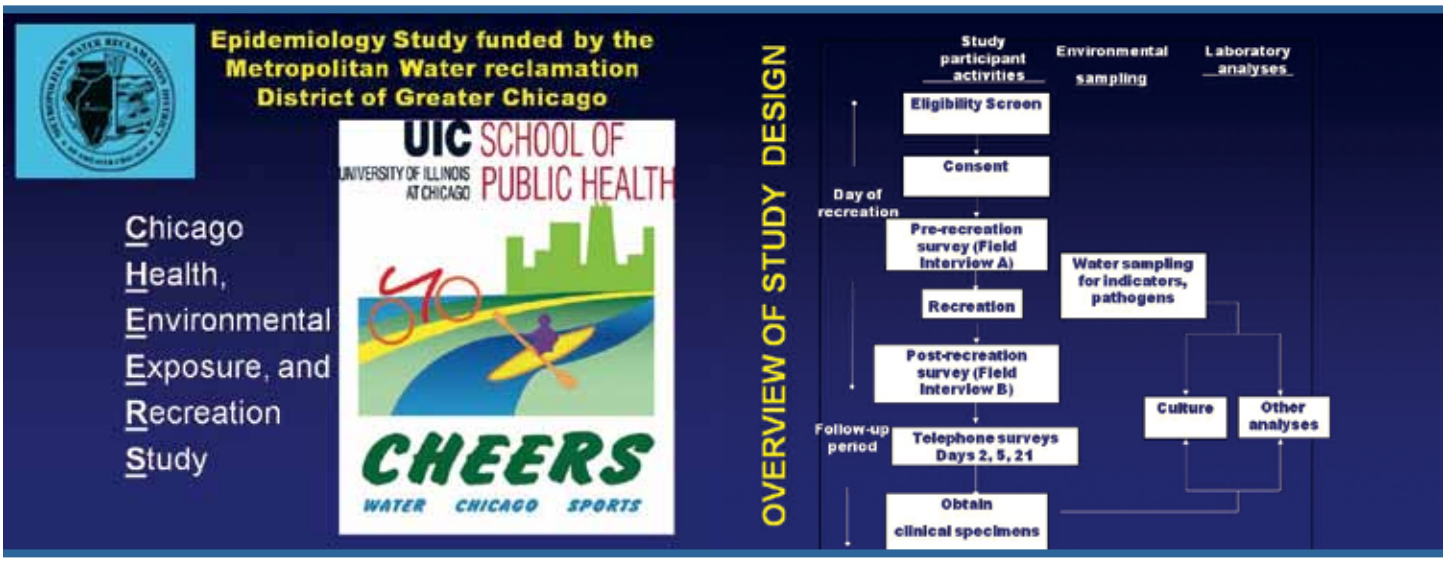
Grand Prize - University Research

Entrant: Metropolitan Water Reclamation District of Greater Chicago

Engineer in Charge: Richard Lanyon, P.E., BCEE, Louis Kollias, P.E., BCEE, Dr. Catherine O'Connor

Location: Chicago, Illinois

Chicago Health, Environmental Exposure, and Recreation Study (CHEERS)



The Metropolitan Water Reclamation District of Greater Chicago (District) embarked on a ground-breaking mission with two precedent-setting public health studies by collaborating with qualified consultants, multi-disciplinary scientists and water quality experts to ascertain human health risks of current practices of un-disinfected effluent discharged to the Chicago Area Waterway System (CAWS).

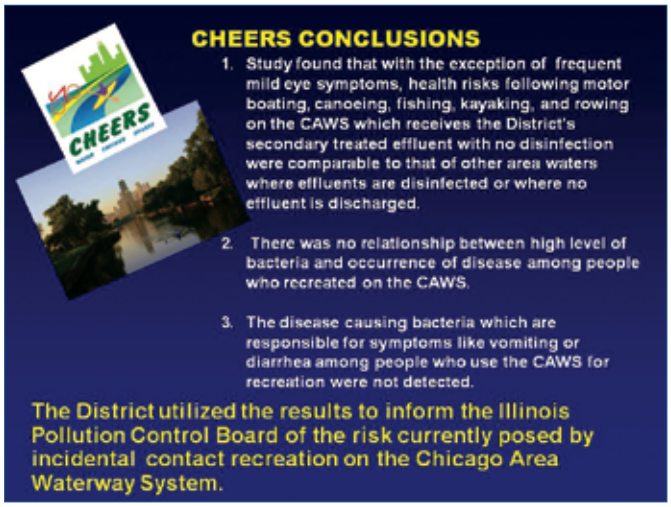
The Chicago Health, Environmental Exposure, and Recreation Study (CHEERS) was conducted by the University of Illinois at Chicago School of Public Health, under the leadership of Dr. Samuel Dorevitch. CHEERS emerged on the heels of a quantitative microbial risk assessment (QMRA) report, which concluded CAWS risks to be below the risk threshold that United States Environmental Protection Agency applies to primary contact recreation. CHEERS is the first U.S. study to evaluate the QMRA study. The CHEERS format followed the USEPA National Epidemiological and Environmental Assessment of Recreational Water study. The Water Environment Research Foundation sponsored an independent review for the entire study period.

The CHEERS required many interviewers, water samplers, water quality technicians, and managers.

One of the important features of CHEERS was that it actually took stool samples and analyzed them for possible pathogens of concern associated with the illnesses detected; this is a first for waterborne illnesses in recreational settings. Water quality monitoring data shows that the densities of indicator microbes, both bacterial and viral, are generally higher at CAWS locations than at general use locations. One notable exception to this observation was that densities of enterococci in the local area rivers were comparable to levels in the CAWS. Higher microbial loads were also found in the tributary river which drains into the CAWS. In comparison to fecal indicators, lower densities of viral and protozoan pathogens were detected in the CAWS.

The CHEERS study concluded that the users of the CAWS did not have gastrointestinal illnesses more severe than that experienced by users of general use waters where swimming is permitted. However, CAWS users were at higher risk for developing mild eye symptoms than people who used other rivers or inland lakes or beaches. In addition, the CAWS water quality data showed that there was no relationship between high level of bacteria and occurrence of illness. Moreover, pathogens like E. coli 0157:H7 or Salmonella, which are responsible for symptoms like vomiting or diarrhea among people who use the CAWS for recreation, were not detected. There was no connection between using the Chicago River and any pathogen.

Supplemental CHEERS research studies have addressed major deficits in our current knowledge on the extent of water exposure and the validation of risk assessment model.



Grand Prize - Small Projects

Entrant: Leggette, Brashears & Graham, Inc.
Person in Charge: Brad Granley
Location: Biloxi, Mississippi

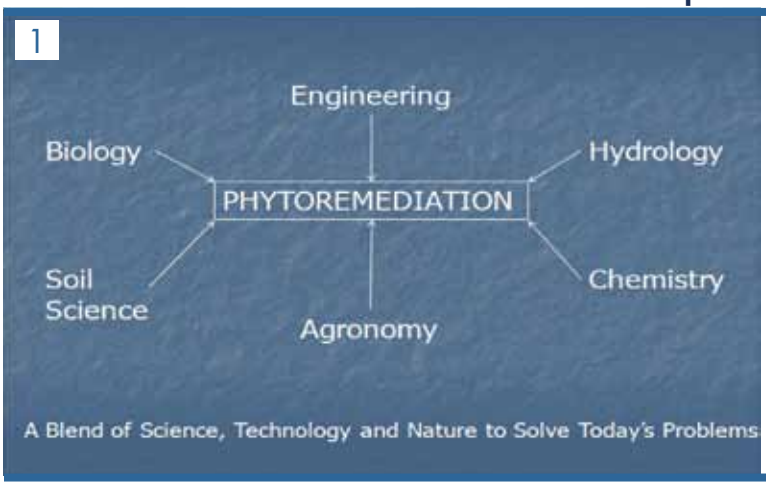
Republic Services, the second largest waste management company in the U.S. has stated their opinion on the success of phytoremediation in the following way,

"We are planning to evaluate this technology for numerous other landfills and expect the industry as a whole to embrace this new leachate utilization tool."

Per Republic,

"The approach is a game changer for leachate management."

Innovative Phytoremediation Process Utilizes Landfill Leachate as a Resource in Lieu of Traditional Disposal as a Waste



In 2010, the U.S. produced 250 million tons (over ½-trillion pounds) of solid waste. Within landfill operations, leachate disposal represents one of the most persistent and expensive long-term challenges and, if not handled properly, can lead to serious environmental problems.

At the Gulf Coast Area landfills (GCAL), leachate problems compounded rapidly when an unavoidable change in site conditions caused leachate production to increase an order of magnitude from 350,000 to 3,500,000 gallons/year.

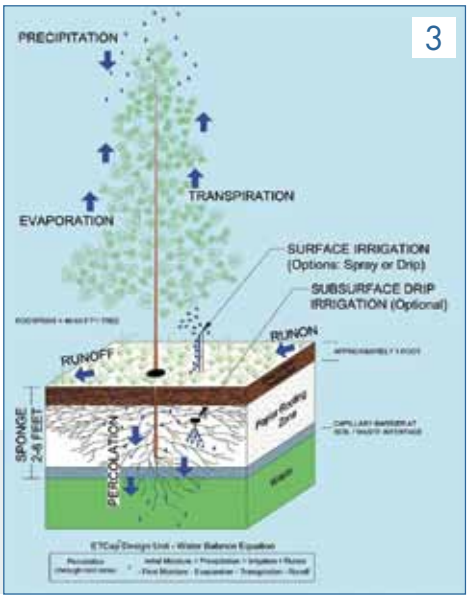
Reducing leachate production was not an option. The production spike and skyrocketing costs resulted in an immediate 'high-priority' status and Leggette, Brashears & Graham, Inc., was contacted to identify a viable alternate solution.

Traditional leachate handling consists of tanker trucks driving to a landfill, filling up with leachate, and driving through communities to dump leachate as additional loading to municipal WWTPs. This 'old way' works, but at considerable environmental and financial cost; especially at GCAL where the accepting WWTP was located 150 miles away.

Leggette, Brashears & Graham, Inc., evaluated numerous traditional and non-traditional options and recommended that phytoremediation should be implemented as a 'new way' to handle leachate. This cost-cutting approach allows leachate to be handled on site. By definition, phytoremediation is a plant-based system used to remove pollutants from groundwater, surface water, soil, or air. Specifically, Leggette, Brashears & Graham, Inc. recommended phytoremediation using a unique grass called vetiver. Vetiver has been in the U.S. for decades, but has never been used to address leachate problems, making the project a first-of-its kind for the U.S. solid waste industry. Vetiver is ideally suited for leachate utilization due to its tremendous water and nutrient demand, fast growth, and extraordinary tolerance to extreme environmental conditions. Vetiver is also a USDA non-invasive plant. Coincidentally, leachate's main components are water and contaminants (micro and macro-nutrients to the plants), exactly what vetiver needs.

Republic's commitment to environmental excellence includes seeking out promising innovative technologies. Phytoremediation was approved on the condition that the existing disposal process was not disrupted. Leggette, Brashears & Graham, Inc., designed and installed an automated leachate pre-treatment and distribution system that responds to changes in leachate production, leachate quality, and weather conditions. The system includes 35,000 feet of underground piping, a specially-designed subsurface drip-irrigation system, and PLC with telemetry for desktop monitoringand adjustments.

The success of this project has caused Republic to embrace a new, environmentally friendly approach to leachate treatment. Phytoremediation has replaced the "old way" at GCAL.



1. To be successful, a phytoremediation project requires expertise from a wide range of specialists and must overcome technical, regulatory, logistical, budgetary, and site restraints.
2. When leachate production spiked to 3.5 million gallons per year at GCAL, the cost to transport and dispose over such a great distance was far too costly, and a better solution was essential.
3. Phytoremediation is a new technology that can treat landfill leachate on site in an environmentally friendly way, and at a much lower cost than traditional methods

Grand Prize - Small Firms

Entrant: Green Stone Engineering, LLC
Engineer in Charge: Daniel R. String, P.E.
Location: Milford, Delaware

Innovation, Safety, and Sustainability at the Kent County Regional Wastewater Treatment Facility

Kent County Levy Court owns and operates the Kent County Regional Wastewater Treatment Facility, which is an advanced wastewater treatment plant with a permitted capacity of 16.3 million gallons per day.

Green Stone Engineering recently designed and supervised the construction of a series of improvement projects that improved the safety, sustainability, and cost effectiveness of the plant located in Milford, Delaware. The overall project included separate improvement efforts.

An Ultra-Violet (UV) disinfection project focused on the converting an old chlorine gas disinfection system to an innovative microwave UV disinfection system. The old chlorine gas disinfection system posed health and safety risks to both plant personnel and the neighboring community. The new system uses UV light to kill harmful bacteria before the treated water is returned to the environment. The UV System utilizes an innovative microwave system developed in Scotland to energize electrodeless bulbs. Kent County's installation was one of the first of its kind in the U.S. and is the world's largest installation to date. By converting disinfection to UV, greenhouse gas emissions have been reduced by more than 50 percent.

The improvements also included the installation of three solar sludge drying chambers and a supplemental heating system to reduce the use of natural gas that previously fueled the thermal dryers. The solar sludge dryers maximize the use of solar radiation in the greenhouse-type structures through the use of fans, mechanical sludge mixing, and monitoring the interior and exterior air conditions to determine the optimum operating conditions within the chambers. What sets the Kent County plant apart from other similar systems is the supplemental heating system. The County installed solar heat collectors which utilize solar radiation to heat a radiant floor heating system beneath the drying chambers. The entire system is anticipated to be capable of drying approximately 15 percent of the total sludge produced at the facility, significantly decreasing natural gas usage, green house gas production, and operating costs.

The overall project also included the installation of over 6,000 Photovoltaic (PV) Solar panels capable of producing almost 1.2 MW of photo-voltaic solar energy, which significantly reduce the overall carbon footprint as well as the operating expense of the facility. The County was able to install enough panels that, on a sunny day, the plant is almost self-sufficient.

1. UV Channel Construction
2. New Passive Solar Drying Chamber with Passive Ventilation Flaps Complete
3. First Load of Dewatered Sludge Loaded for Drying Chamber Testing

Grand Prize - Environmental Sustainability

Entrant: Housing and Development Board (HDB)
Engineer in Charge: Er. Yap Tiem Yew, Er. Khoo Tou Khiang
Location: Singapore

My Waterway@Punggol - Singapore's Longest Man-Made Waterway

1


2

My Waterway@Punggol, Singapore's longest man-made waterway, is one outstanding example of how HDB confronts the challenge of providing a vibrant and sustainable town by creating social communal spaces integrated seamlessly along the waterway for the enjoyment of Singaporeans.

The making of My Waterway@Punggol kick-started with HDB working closely with government agencies including Urban Redevelopment Authority, Public Utilities Board, National Parks Board, Land Transport Authority and Singapore Sports Council to conceptualize a landscaped waterway which meanders through Punggol, taking into consideration the existing terrain and infrastructures, land-use planning, etc.

My Waterway@Punggol took 2.5 years to complete, costing approximately S$225 million, and was opened by Prime Minister Lee Hsien Loong on October 23, 2011. It meanders through Punggol Town, creating a delightful waterfront living environment, and acts as the "green and blue spine" linking the Punggol and Serangoon reservoirs. It features a landscaped promenade, five footbridges, viewing decks, cycling and jogging paths, exercise and water-play areas, lush greenery and eco-friendly features, such as eco-drains that cleanse surface run-off water, and aerators, jet fountains and water curtains to enhance water quality.

The design and construction of My Waterway@Punggol was no easy feat for HDB. In line with the vision to develop Punggol as Singapore's first eco-town, HDB took efforts to ensure construction was carried out in an environmentally sustainable manner and the area's natural rich biodiversity is preserved. In addition, to overcome site constraints such as poor soil condition and protecting existing rail transit structures, innovative techniques and green construction practices were adopted to maximize efficiency and yield cost savings.

Vehicular bridges and footbridges along the waterway provide seamless connectivity between both banks of the waterway. The footbridges were designed with barrier-free accessibility features to cater to the young, old, and the physically-challenged.

The waterway and reservoirs allow opportunities for water-based recreational activities within the heartlands. With more upcoming housing developments along the waterway, residents can enjoy waterfront views and easy access to the waterfront promenades. New housing forms, both public and private, some with terraced gardens and courtyards are envisaged to front the waterway. This further reinforces the theme of "Green Living by the Waters' and positions HDB's vision of Punggol Town as "The Waterfront Town of the 21st Century."

My Waterway@Punggol is a "green-and-blue" spine that exists in harmony with nature. It provides a conducive environment for social engagement, heritage preservation, and easy access for all.

3

1. Design Concept: Design of the waterway was conceptualized based on 3 key design elements Green, Water, and People.
2. Heritage Trail to preserve memories and heritage of the old Punggol so that the Singaporeans can relive a piece of history while enjoying the waterway.
3. My Waterway@Punggol is located at the North-Eastern edge of Singapore in Punggol Town, flanked by two rivers (Sungei Serangoon and Sungei Punggol).

Honor Award - Environmental Sustainability

Entrant: HDR

Person in Charge: Mark Roberts

Location: Conley, Georgia

Hickory Ridge Landfill Solar Energy Cover

The Hickory Ridge Landfill closure represents a milestone in the solid waste industry because it replaces a traditional Subtitle D closure – which covers a geomembrane liner with layers of soil and grass – with an alternative cap system that provides many environmental and economical advantages. The solar energy cover helps avoid thousands of tons of greenhouse gases that would be emitted from the mowing and soil replacement activities needed for long-term care of a grass-covered cap. Also, because rainwater runs off the geomembrane, reusable water can be harvested without the need for sedimentation and cleaning. But perhaps most importantly, this remarkable cover system creates clean, renewable solar energy.

By using exposed geomembrane solar cap technology Hickory Ridge Landfill has been transformed into the largest solar energy generating facility in Georgia. The solar energy cover produces more than 1 megawatt of renewable electricity.

This new and innovative technology caps the landfill with an enhanced geomembrane anchoring system developed by HDR – essentially taking a durable, high-strength geomembrane material made for outdoor exposure on roofs and securing it to the landfill like a bedsheet through the use of vertical anchor trenches. The geomembrane-covered landfill sideslopes provide an ideal, clean, and stable surface for thin-film photovoltaic solar panels to be directly adhered. The Hickory Ridge Landfill Solar Energy Cover uses over 7,000 solar panels to convert sunlight into more than 1 megawatt of clean, renewable electricity for the owner, Republic Services, and the local community.

HDR was responsible for the permitting and construction design of the alternative closure cap, provided the bid and construction documents, and also provided construction management and field engineering services during the exposed geomembrane and solar cap deployment.

The Hickory Ridge Landfill Solar Energy Cover's distinct shape, bright green color, and south-facing solar array catches the eye of travelers flying in and out of busy Hartsfield-Jackson International Airport, sparking discussion about the unique project's environmental and economic benefits.

Honor Award - Industrial Waste Practice

Entrant: CDM Smith

Engineer in Charge: Robert J. Kimball, P.E., BCEE

Location: Sheridan, Wyoming

Marathon Oil Company Adam's Ranch Water Treatment Facility

CDM Smith implemented a first-of-its-kind water treatment and reuse system for Marathon Oil Corporation at their Adam's Ranch water treatment facility in Sheridan, Wyoming. The cutting-edge, environmentally friendly facility uses a patent-pending treatment process that reliably, safely, and cost-effectively surpasses all water discharge limits, preserves natural resources and fresh water supplies, and controls treatment costs.

CDM Smith designed, constructed, and is now operating the integrated green sand filtration, ion exchange, and reverse osmosis process that operates at a very high water recovery rate - more than 99 percent - and dramatically reduces the use of chemicals, such as sulfuric acid. Consistently delivering compliant water, the system allows effluent to be reused for irrigation and supports holistic water management in the Powder River Basin - eliminating deep-well injection or direct discharge and extending water resources for local farmers.

Because the new process requires little chemical addition and produces a small amount of brine, the number of trucks to the rural Wyoming site is cut by 75 percent. This greatly reduces operational costs, traffic volume, and the potential for accidents and hazardous material spills.

To get the plant online in less than one year, CDM Smith used a design-build approach to address complex piping layouts, minimize potential design conflicts, and maintain the tight project schedule. The new system also reuses the existing building and much of the existing equipment to significantly reduce the plant's final cost. Design flexibility allows for future upgrades or the cost-effective relocation or reuse of equipment.

The entire project was completed without a single safety incident, an accomplishment recognized by the National Safety Council with a valued Safety Performance Award.

Marathon Oil Company sought a reliable water treatment process for their Sheridan, Wyoming gas field. Through design-build delivery, CDM Smith implemented a first-of- its-kind, innovative water treatment and reuse system that meets water discharge limits, protects fresh water supplies and controls treatment costs for Marathon.

Grand Prize - Industrial Waste Practice

Winner of The W. Wesley Eckenfelder Industrial Waste Management Medal sponsored by Veolia Water

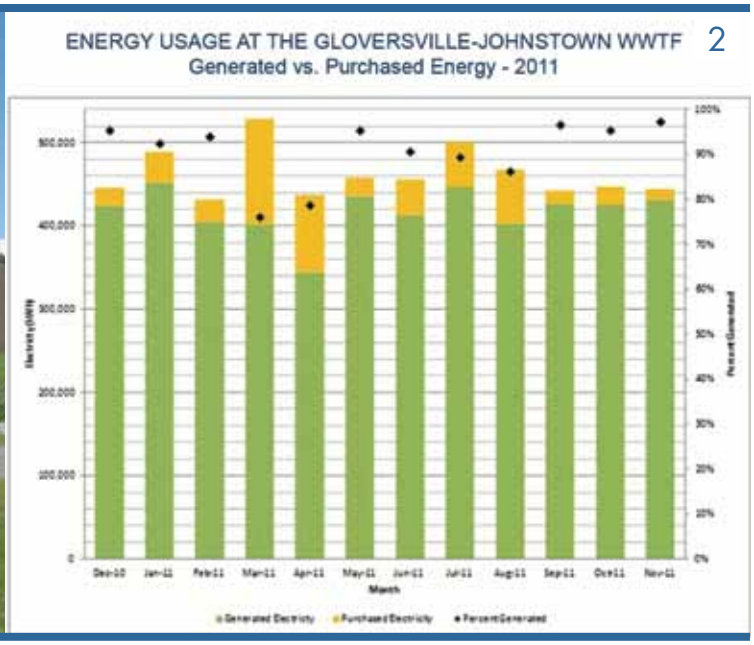
Entrant: Malcolm Pirnie, the Water Division of ARCADIS

Engineer in Charge: Daniel Loewenstein, P.E., BCEE

Location: Johnstown, New York

Co-Digestion and Combined Heat and Power Improvements

1



2

With the completion of the latest round of upgrades and improvements, the Gloversville-Johnstown Joint Wastewater Treatment Facility has achieved a remarkable goal – it is the first and only U.S. wastewater treatment plant that can produce 100 percent of its own power using renewable biogas to fuel a combined heat and power system – in other words, a zero net energy capable facility. Engineered by Malcolm Pirnie, the Water Division of ARCADIS, the improvements utilized significant grants from State and Federal agencies, including the New York State Energy Research and Development Authority. In 2011, the plant produced 91 percent of its electrical usage – up nearly threefold from its 2009 energy generation. If the State of New York changes the net metering law to include biomass from municipal wastewater treatment plants, the facility could produce 110 percent of its own power needs.

In this innovative application of co-digestion, high-strength dairy wastes from local yogurt and cheese manufacturers are treated along with municipal sludge to generate electricity. Renewable biogas fuels two new 350 kW engine generators. The installation of an innovative technology – a recuperative thickening loop – significantly decreased capital costs by increasing digester capacity without constructing capital intensive additional anaerobic digesters. Waste heat recovered from the generators provides for digester and building heating needs, eliminating the need for purchased natural gas. Other improvements included additional dewatering capacity and more efficient gravity belt thickeners.

The project represents a synergy between municipal and industrial needs. When the plant's traditional industrial user base relocated offshore in the early 1990's, leaving significant underutilized digester capacity, the plant's management was ultimately able to attract two cheese and yogurt manufacturers to relocate to the adjacent industrial park, where they contribute an increasing volume of high-strength dairy waste loadings. Various upgrades were made to accommodate the manufacturers' changing needs and incorporate enhanced technologies.

The project is now a resounding success – it created temporary construction and permanent manufacturing jobs, a major benefit for this economically hard-hit community. Other economic benefits include fees from processing whey and reduced operating costs from energy generated onsite.

The plant is an acknowledged leader in sustainable wastewater treatment – it cut energy consumption and increased energy generation, while the improved process also reduces greenhouse gas emissions by over 600 percent.

1. Digester and Cogeneration Facility - The GJJWWTF was designed to treat 13 million gallons per day of combined municipal and industrial wastewaters. In recent years, with the loss of the area's traditional leather and tanning industries, the WWTF experienced reduced industrial waste loads and declining revenues. To reduce operational and especially energy costs, the Board decided to modify the aeration system and upgrade solids handling systems
2. Energy Usage - Generated Energy vs Purchased Energy - 201.1 As this graphic illustrates, in 2011, the plant typically produced over 91 percent of its electrical usage – average monthly electrical production increased nearly threefold from 142,800 kWh in 2009 to 417,000 kWh in 2011. In 2009 the digesters produced 8.8 cubic feet of gas per lb of volatile solids destroyed (ft^3/lb VS); in 2011, the digesters produced 21.8 ft^3/lb VS and the SRT increased from 13.4 days to 21.5 days. When the facility lost power several times, the generators automatically switched to island mode so seamlessly that the facility's operators failed to recognize that utility power was lost.

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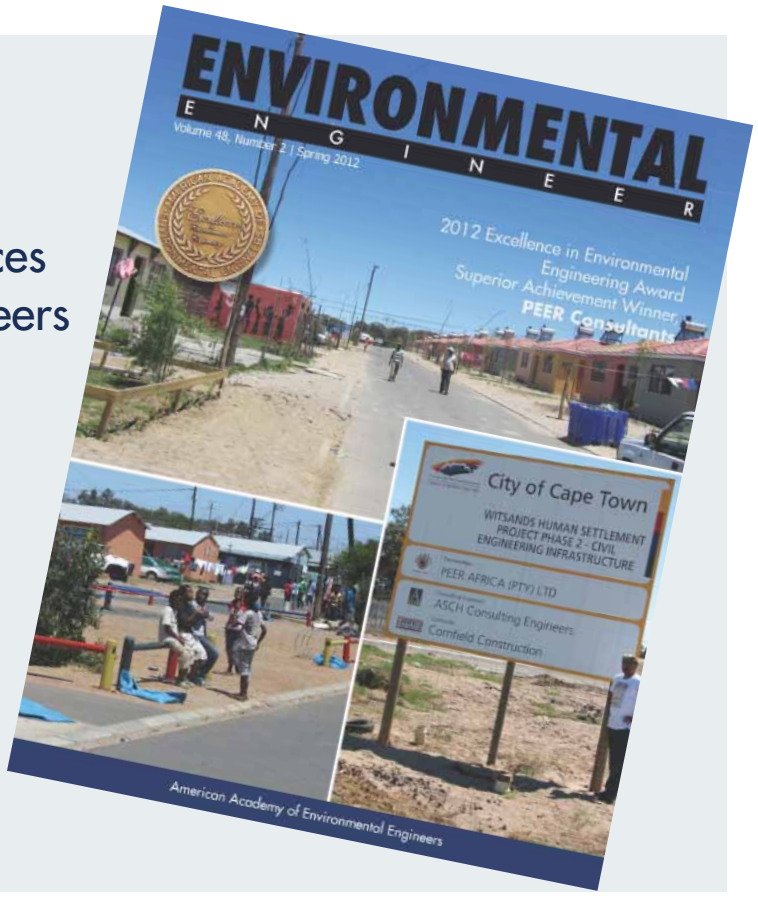

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