

NC Currents

THE OFFICIAL PUBLICATION OF



FALL 2011

SAVE WATER

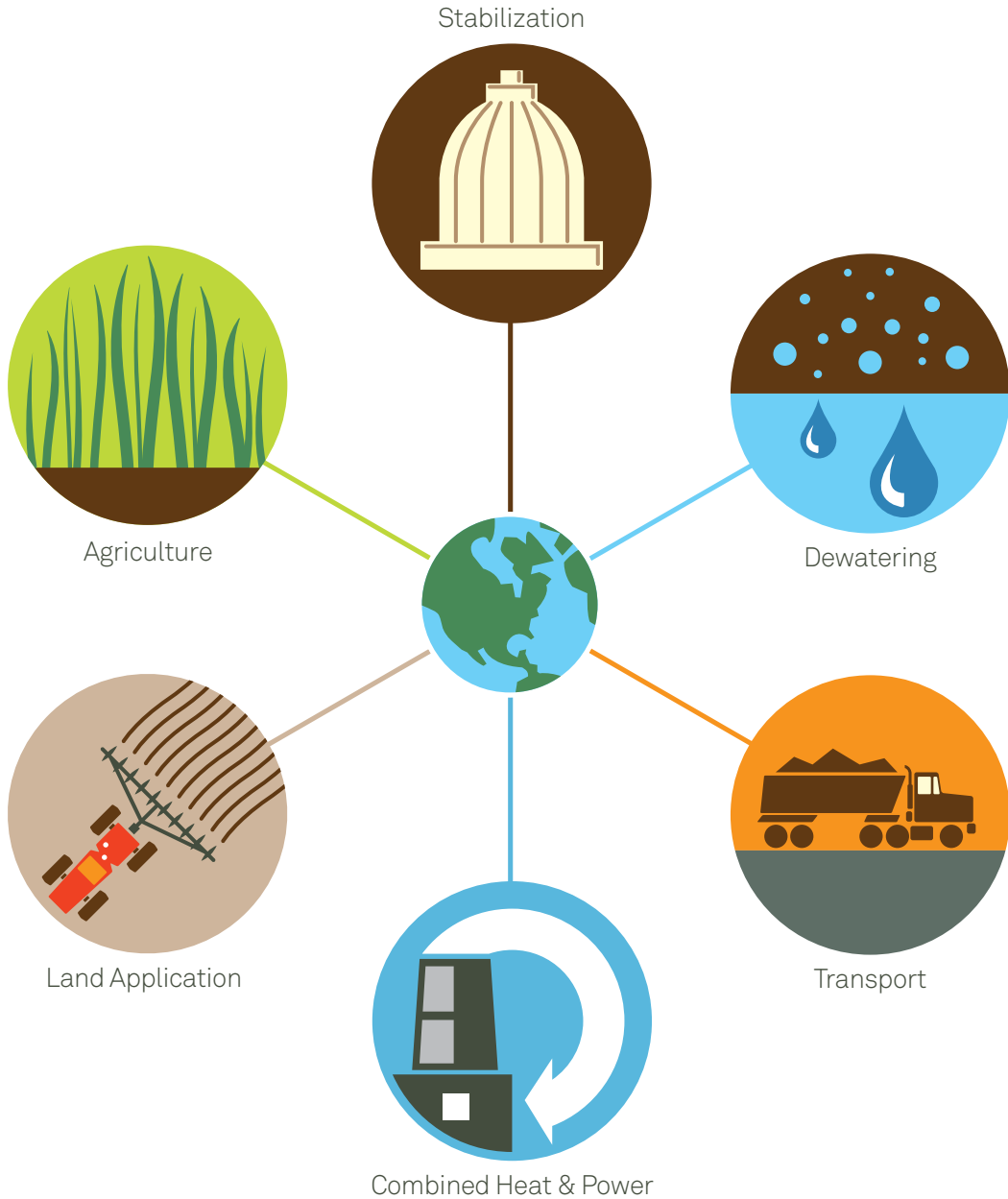
Special
Section

EDUCATING OUR
COMMUNITIES;
Effective Public Education
Efforts in North Carolina

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November 13-16, 2011
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NC Currents is the official publication of the NC AWWA-WEA. Members and non-members, individuals and committees are encouraged to submit content for the magazine. If you would like to submit an article to be considered for publication in NC Currents please email it to nbanks@ncsafewater.org.

Submission Deadlines for 2011:
 Winter 2012 - October 10, 2011

NC Currents is produced by the Communication Committee. Chair: Bob Griffin, Shield Engineering, Vice Chair: Howard Kimbrell, Highfill Infrastructure Engineering
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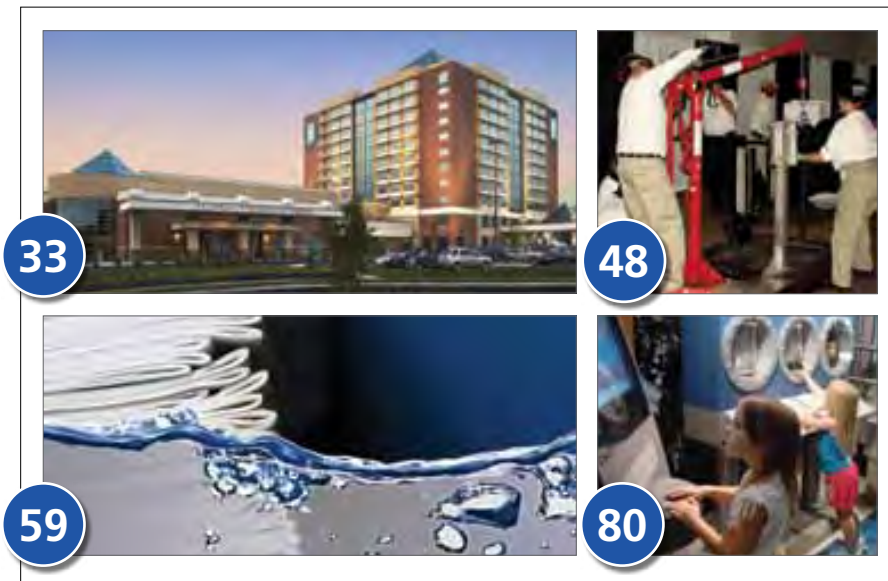
NC Currents is published by

Tel: 866-985-9780
 Fax: 866-985-9799

www.kelmanonline.com

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 Advertising Coordinator: Lauren Campbell

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Cover Image:

City of Durham 2011 Water Conservation Poster Contest, Second Place, 3rd – 5th Grade Division, Sarah Kim, Durham Academy



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Effective Public Education

John Kiviniemi

I have a motivational poster by Successories on the wall of my office entitled: IMAGINATION – “What we can easily see is only a small percentage of what is possible. Imagination is having the vision to see what is just below the surface; to picture that which is essential, but invisible to the eye.” The eye catching image on the poster is that of an iceberg floating in the water – it allows the viewer to see the reality that lies beneath the surface of the water. For me, this image is one that captures the essence of this edition’s theme – ‘Educating Our Communities; Effective Public Education Efforts in North Carolina.’ The future of our Association, our respective utility organizations, and that of our local communities can all be positively impacted by effective public education and outreach programs; providing a platform for us to look beneath the surface, so to speak, to convey with a collective voice that ‘Water Matters!’

As I mentioned in my previous article, somewhere along the way we have lost sight of the importance of water. I know what many of you are thinking...no not me; I am a water industry professional. But if we are truly honest, we must all admit that we often take water for granted. Do you ever expect to turn on the tap and not receive clean, safe water? Do you ever flush the toilet and stop to think where it goes? Do you ever hesitate wading through a stream or jumping in a lake, in terms of whether it is safe? Perhaps that is because we, as water professionals,

know what it takes to insure public health by maintaining a clean, safe water environment. What we tend to forget though is that the majority of the public doesn’t. The irony is that the availability and reliability of our public utilities are taken for granted, especially in terms of value. Most Americans are willing to pay, without question or complaint, triple digit mobile phone, cable TV and/or Internet bills – but have been conditioned to think that water is (or should be) free. I guess water is free; it is the service (distribution/ collection/treatment) that is not. Somehow as water industry professionals we must invest the necessary time, energy and resources into our public education and outreach programs to insure that we change this mindset. Our Association, in conjunction with NCWOA and NCRWA, is working collaboratively to develop and implement a public education marketing

plan to do just that – to convey in an effective and impactful way the simple message that water matters. The message is only half the battle though; we must strive to become better known to the general public - as I hazard a guess that ‘NC AWWA-WEA’ is not exactly a household name. Perhaps it is time we finally transition away from the alphabet soup and over to a more readily identifiable moniker – ‘NC Safe Water?’ If we are to realize our vision to be the organization the public looks to as the voice for water, our name should effectively communicate who we are and what we are about – not to mention the branding/marketing opportunities in this regard.

As we turn our attention to message, no greater opportunity likely exists than that of utilizing children as the conduit to convey our public education and outreach message(s). In thinking back to when my


“Most Americans are willing to pay, without question or complaint, triple digit mobile phone, cable TV and/or Internet bills – but have been conditioned to think that water is (or should be) free... Somehow as water industry professionals we must invest the necessary time, energy and resources into our public education and outreach programs to insure that we change this mindset.”


Message from the Chair

children were little, I am reminded of an incident with my daughter Ashley. I was working for the City of Raleigh at the time, and she was at that age when you had to lock everything down or put things out of her reach. Back then they didn't have the plethora of lock devices that exist on the market today; most notably there was no lock for the toilet. In an attempt to foster our potty training efforts, we told her that when you flushed the toilet it went to "daddy's treatment plant." While this seemed to help, in the end there were unintended consequences. I received a call at work one day – it was my daughter saying repeatedly ... "daddy, did you get my message?" After numerous attempts to get to the bottom of her inquiry, my wife eventually got on the phone to more fully explain. Ashley had scribbled me a message with a crayon on a full sheet of paper, crumpled it up and dutifully flushed it down the toilet. She didn't know much about water at that age, but she knew that when you flushed the toilet it went to "daddy's treatment plant" - if we could only get everyone else to understand that basic tenant. There is a wealth of opportunity to convey pertinent information about the water environment to our children, most notably through our schools. Our Association, specifically

our Public Education Committee, has a long history of effective programs and outreach to school age children. We have been sponsors and supporters of countless programs (science fairs, essay contests, Stockholm Junior Water Prize, etc.) in schools across the State; not to mention providing funding through our endowments for (college) scholarships and continuing education for NC teachers. I was saddened to hear that State budget impacts to school system funding had tangential impacts on what was a hugely successful public education and outreach program, the City of Raleigh's – 'Water-Fest.' It was a multi-day event where countless school age children came out to one of the treatment plants for a fun filled day, all about water. Our respective utility budgets have been similarly impacted by the tough economic times, resulting in difficult decisions being made about a utility's ability to continue these programs. Perhaps it is time that our Association sponsored these types of events; through the schools, local communities or perhaps even more creative venues like our State Fair. With respect to the latter, can you imagine the thousands of people we could reach with respect to conveying the message that water matters?

As we move towards the inevitable loss of seasoned industry professionals, we must strive to identify, develop and impassion those that will take their place. In terms of post-secondary education that speaks to student chapters, we initiated our 1st student chapter at UNC-Charlotte last year, and we were blessed to launch our 2nd student chapter at NC State University earlier this year. As a Wolfpack alumni this is a success to which I am especially proud. It is our hope that in the future we will have numerous other active student chapters throughout our NC college/university system. I have been amazed at the energy and passion that this demographic brings to the table. But having student chapters is only part of the equation; getting them plugged into and involved in the life of our Association is the key. These individuals will be our successors in the workplace as well as within our Association in terms of leadership – they are ready, willing and able – we have to engage them now! Fostering engagement in the water industry is imperative – whether it is through the identification of a career path, local community involvement or even via the political front. Public education and outreach programs are the conduit to achieve success in this regard. Our future depends on us helping people (re-)discover that water matters.

This is my final article as your Chair – it has been both a privilege and honor to serve in this capacity. This year we have made great strides to improve our position as an effective and sustainable organization – making substantive changes to our organizational structure, governance and strategic planning model. I likened making these changes to a seasoned organization like ours to that of turning a (big) ship - it will turn but it takes time, so it is imperative that we keep our eye on the horizon. Our new SONAR strategic planning model will serve in this regard – helping us to perhaps avoid those icebergs that will inevitably be floating out there as we navigate the waters of the future. In closing, I want to thank you for all that you do as water industry professionals to protect and maintain a clean, safe water environment. 



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Pearl of Great Price

Lindsay Roberts, Executive Director

In the biblical parable, Matthew 13:45-46, a merchant finds one pearl of great price and he sells all that he has in order to buy it. Water is like that pearl, perfection in its natural state, and for those without it, worth a very great price.

Every drop of water does have economic value – the value of what we do with that water – whether it is growing a field of rice, cleaning it and packing it, boiling it in a pot, or eating it as the day's nourishment. But we are unaccustomed to that valuation. We behave in our daily lives, as if safe water, available at the turn of a tap, has no value.

Benjamin Franklin is often quoted as saying "When the well is dry, we shall know the value of water." Perhaps we might add some new aphorisms that begin to capture the issues of water and wastewater that the public most needs to grasp right now:

"When water mains break, we shall know the value of funding renewal and replacement."

"Free water, fun while it lasts and gone 'fore you know it."

"Wastewater processed 'til treatment plants poop out"

Or perhaps, as a counter to the bottled water industry, "Tap water - drink it while it lasts."

These 'tongue in cheek' sentences might not have the time-tested

ring of Benjamin Franklin's quote, but every one of them has a ring of deadly earnestness to it.

We have a mighty opportunity unfolding before our eyes right now, and a challenge of gigantic proportions – we must now, immediately, focus on closing the knowledge gulf that separates our communities – voters, tax payers and elected officials – from the reality that we must deal with daily in our quest to ensure that safe water flows from every tap, and wastewater reaches plants and is treated to keep that water safe, our people and environment healthy and our economy vibrant.

Historically, it has been our pride and joy to keep a low profile, and it has served us well in the past, to do our work quietly and efficiently.

That is what we have done – deliver safe, clean water to every tap and remove and safely treat wastewater from every toilet and sink without any fuss. Day-in, day out, just good work with no newspaper articles, no TV crews. Our elected officials have liked it best that way too. Any publicity for water or wastewater has generally been bad – a spill; a collapse or break; a boil-water notice ... definitely the sort of thing to be avoided.

Public education has, for most of us, been a relatively small-scale effort consisting of poster contests, outreach to school children through science fairs, small scholarships to promote interest in the profession. We have taken the position that this outreach effort will pay off over the long haul, as those children grow up and become voters and elected officials, or choose professions. During droughts, we have done a little better with conservation messaging.

We have not had the luxury of resources to develop a public education campaign, and for the most part, we have not used our limited resources developing relationships with news media or cultivating strong working relationships with legislators.

Small wonder then, that the public we serve so faithfully knows so little about where the 410 billion gallons of water that



is seamlessly, transparently transported to them in the U.S. each and every day comes from, nor where it goes after they use it. Small wonder also, that now, as our infrastructure ages, population grows, climate patterns shift, ever-more sophisticated testing leads to ever-higher treatment regulations requiring ever-higher costs, we, in the water industry face the daunting task of trying to close that knowledge gap. But close it we must.

Finally, we are getting some real help in getting the media to spot-light water issues:

Charles Fishman is a journalist and best-selling author of a book published by Free Press in April this year, titled *'The Big Thirst – The Secret Life and Turbulent Future of Water.'* Peter Coclanis, who is the Albert R. Newsome Distinguished Professor of History and Director of the Global Research Institute at UNC Chapel Hill, wrote a review published in *The Raleigh News*

and *Observer* on May 15, calling the book "a tour d'horizon and a tour de force" – and it is all of that. It is a fascinating, amazing, awe-inspiring and delightful read, written in a way that allows any reader to be engaged (at last!) and educated in a way that isn't lecturing or pedantic or too academic.

And Mr. Fishman's book isn't the only one. Suddenly, there are lots of books about water – *'Unquenchable – America's Water Crisis and What To Do About It'* by Robert Glennon, published by Island Press, 2009; *'The Future of Water – A Startling Look Ahead'* by Steve Maxwell with Scott Yates, published by AWWA, 2011; *'Water – The Epic Struggle for Wealth, Power and Civilization'* by Steven Solomon, published Harper Collins, 2010; and *'Bottled & Sold – The Story Behind Our Obsession with Bottled Water'* by Peter Gleick, published by Island Press, 2010.

NC AWWA-WEA has, this past year, been working in partnership with our sister-organizations NCRWA and NCWOA, and we jointly engaged with Consultant, Linda Vaughn, to help us to try and develop a strategy for expanding our public education outreach efforts. We found that we were flush with ideas and energy for the task – it is just the resources that constrain us. But we cannot afford to wait for school children to grow up, for the public to wake-up and read the great books that would remove the scales from people's eyes.

The down-turn in our economy has diverted already-scarce resources from infrastructure, and competes with us in our efforts to get the attention of the public for the vital discussion about management of the resource and the infrastructure that is required to keep on delivering the clean and removing the waste. Charles Fishman writes that "the intensity of water as a public policy issue in the developed world is not to be underestimated....Water may be mostly ignored, but when it becomes important, it often ends up being about emotion as much as science or rational policy-making. When water becomes a crisis, when it cascades into politics, our responses are hard to predict and hard to manage." And for this very reason, we must, as he says, find "a way of talking calmly and thoughtfully about water."

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Charles Fishman says that big companies whose products rely on water “get it.” Between 2003 and 2010, he notes that a major shift occurred for such businesses – like Coca Cola, IBM, and MGM Resorts. In 2003, Coke did not consider water a ‘raw material’ and didn’t list it on their business operation filing with the SEC, but Fishman notes that in 2010, Coke’s 10-K filing with the SEC lists water as a main

ingredient in Coke’s products, and goes on to say that Coke “recognizes water availability, quality and the sustainability of that natural resource for both our operations and also the communities where we operate as one of the key challenges facing our business.” And Coke found ways to conserve water, reducing usage by 8 billion gallons in 2008.

Now, we have to make sure that the

public “gets it” - tax payers, voters and elected officials.

So, whether we have the resources for public education outreach or not, we have a duty and an obligation to do better at educating the public. We must and we will continue to work to begin getting the pearl-that-is-water, out of the oyster-shell of ignorance that conceals it, so that all may know the great price that it is worth. [MS](#)

Training Report

Seminars and Workshops has been running strong all summer and continuing into the fall. In early June, we had a good crowd of 40 attendees that joined us at the Neuse River WWTP for the Wastewater Treatment Plant Optimization seminar. We then traveled to Hickory for our first Regional Training Day with 58 attendees. The Young Professionals took over Bryan Park

in Greensboro for the Stormwater Effects for Water and Sewer Projects seminar on July 19th. We then brought July to an end with one of our most popular seminars, Drinking Water Rules & Regulations, before heading to Greenville in August for Back to Basics and Effective Utility Management. We then finished the summer on a high note with our second Regional Training Day

at the McKimmon Center in Raleigh.

With fall in full swing, we have plenty more trainings coming your way. Our busy committees and volunteers are eagerly working on making the remainder of the year as successful as the first half. We hope to see you out at one of our upcoming events soon! If you have any questions, please call the office at 919-784-9030. [MS](#)

DATE	EVENT	LOCATION	# ATTENDED	COMMITTEE
February 22, 2011	NC AWWA-WEA Seminar: Saving Money With Sustainability	Embassy Suites Concord Convention Center – Concord, NC	24	Sustainability
February 22, 2011	NC AWWA-WEA Seminar: Working With Your Customers: Crafting Great Customer Service Policies	Embassy Suites Concord Convention Center – Concord, NC	37	Finance & Management
March 8, 2011	NC AWWA-WEA Seminar: Facing Water Reuse Challenges	UNC Charlotte Student Union Building – Charlotte, NC	78	Water Reuse
March 14-18, 2011	NC AWWA-WEA 62 nd Eastern Collection and Distribution School	NCSU McKimmon Center – Raleigh, NC	447	Collection & Distribution School
March 27-29, 2011	NC AWWA-WEA 10 th Annual Spring Conference	Wilmington Convention Center – Wilmington, NC	477	Annual Conference Coordinating, Spring Conference subcommittees
April 13, 2011	Water Treatment Plant Optimization Seminar	D.E. Benton WTP – Raleigh, NC	32	Seminars & Workshops Committee
May 2-6, 2011	Eastern Biological Wastewater Operators School	NCSU McKimmon Center – Raleigh, NC	157	Wastewater Operators Schools Committee
May 3-6, 2011	Physical/Chemical Wastewater Operators School	NCSU McKimmon Center – Raleigh, NC	53	Wastewater Operators Schools Committee
June 7, 2011	Wastewater Treatment Plant Optimization Seminar	Neuse River WWTP – Raleigh, NC	40	Seminars & Workshops Committee
June 23, 2011	Western Regional Training Day	Hickory Metro Convention Center – Hickory, NC	29	Seminars & Workshops Committee
July 11-15, 2011	Western Biological Wastewater Operators School	WPCC Foothills Higher Education Center – Morganton, NC	90	Wastewater Schools Committee
July 11-14, 2011	Maintenance Technologist School & Exam – Grades 1 & 2	WPCC Foothills Higher Education Center – Morganton, NC	60	Plant Operation & Maintenance Committee
July 19, 2011	Stormwater Effects for Water and Sewer Projects	Bryan Park – Greensboro, NC	24	Young Professionals
July 26, 2011	Drinking Water Rules & Regulations	McKimmon Center – Raleigh, NC	77	Seminars & Workshops
Aug 1-5, 2011	Western Collection & Distribution School	WPCC Foothills Higher Education Center – Morganton, NC	337	Collection & Distribution Schools Committee
Aug 11, 2011	Back to the Basics Seminar	City Hotel and Bistro – Greenville, NC	27	Seminars & Workshops
Aug 11, 2011	Effective Utility Management	City Hotel and Bistro – Greenville, NC	50	Finance & Management
Aug 24, 2011	Eastern Regional Training Day	McKimmon Center – Raleigh, NC	109	Seminars & Workshops
Aug 29-Sept 1, 2011	Maintenance Technologist School and Exam – Grades 1 & 3	Neuse River WWTP – Raleigh, NC	108	Plant Operations & Maintenance Committee
Sept 20, 2011	Understanding Your SCADA System and Managing Those “Annoying” Alarms	Village Inn – Clemmons, NC	52	Automation Committee
Sept 20, 2011	Safety & Health Seminar Series	Village Inn – Clemmons, NC	20	Safety Committee

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Summary of The NC AWWA-WEA Board of Trustees Meeting

The most current meeting minutes are available on the Board of Trustees page of www.ncsafewater.org

May 19, 2011

Lee S. Dukes WTP in Huntersville, NC

The following actions were taken during this meeting:

1. A new BOT agenda format was previewed at this meeting with three main components: 1) Reports, 2) Strategic Governance Discussion, and 3) Action Items which will allow the BOT to be more forward-focused and nimble.
2. The Board approved the Reports with the following highlights:
 - a. Approval of the Constitution and Bylaws for the formation of the NCSU Student Chapter of WEF,
 - b. Approval of "The Les and Elaine Hall Water Environment Stewardship Fund" to provide scholarships to engineering students, and
 - c. Approval of a resolution in honor of Morris Tarlton, who passed away in May 2011.
3. The Board approved the forming of an e-Learning Task Force to further

develop an e-Learning Program to deliver training tailored to the needs of water and wastewater professionals.

4. The Board reviewed a preliminary plan to form Councils similar to the new structure of AWWA. Councils will increase the level of volunteer oversight and coordination of committee work and will eliminate silos that result from a lack of flow of timely information. Two councils are already in place and functioning well: Conference Coordinating Council and Awards Council. Three additional councils are proposed: Executive Council, External Affairs Council, and Technical Coordinating Council. The BOT will review the details of the Council formats, roles, schedules and budget impacts at the July BOT meeting.
5. The Board approved committing \$5,000 to the public education component of the joint Public Education and Marketing Plan that NC AWWA-WEA is participating in with NCRWA and NCWOA.
6. The Board came to a consensus that the Business Plan process will now become a future-oriented document that will focus on the presentation of the Strategic Plan and initiatives proposed to achieve future organization goals.
7. The Board approved the Endowment Committee appointees (John McLaughlin; Mike Osborne; Chris Belk and John Roberts); and the revisions to the Endowment Policy provided by the Committee.
8. The Board approved the proposed format of the GAC sponsored Water Day to be held on June 21st and funding up to \$4,000 to support the event. The GAC will provide the BOT with a summary of the major bills of interest that the GAC would like to discuss with the legislators for an eVote to refine the message to the legislators.
9. The Board approved Director Roberts to execute a new lease agreement for the current office space for an additional 3 years at a reduced rate. [↗](#)

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NC AWWA-WEA Committee Chairs

For more committee information visit individual committee web pages on www.ncsafewater.org.

Annual Conferences Coordinating Committee & Subcommittees

BOARD LIAISON: Steve Drew (336) 373-7893 * SC indicates a subcommittee

COMMITTEE	CHAIR/CONTACT #	COMMITTEE	CHAIR/CONTACT #
Conferences Annual Planning	Kasey Monroe (828) 478-3040	Annual Conference Program SC	Terry Draper (704) 542-0220
Exhibits SC	Jim Anderson (704) 323-7031	2011 Spring Conference SC	Lynda Elliott (704) 432-2953
Annual Conference Local Arrangements SC	Tim Lowder (704) 334-5345	2011 Spring Conference Program SC	Paul Shivers (910) 313-1516
		2012 Spring Conference SC	Mary Knosby (704) 338-6857

Awards Committee & Subcommittees

BOARD LIAISON: John McLaughlin (704) 527-4106 * SC indicates a subcommittee

COMMITTEE	CHAIR/CONTACT #	COMMITTEE	CHAIR/CONTACT #
Award Committee	John McLaughlin (704) 527-4106	Fuller Award SC	Robert Walters (336) 731-5526
5S SC	John Roberts (919) 410-2880	Hatfield Award SC	Ken Vogt (910) 332-6586
Bedell Award SC	Howard Kimbrell (919) 678-8032	Kenneth J. Miller WFP Award (WFP) SC	Ilke McAliley (704) 338-6794
Burke/Courman Awards (Safety) SC	Dennis Parnell (919) 807-2603	Lab Analyst Award SC	Tamika Black (919) 662-5700
Ebert Award (Bd of Ed & Ex) SC	Thurman Green (919) 537-4224	Piatt/Mafitt Award (Membership) SC	Laurin Kennedy (704) 342-4546
Educator of the Year Award SC	Bob Griffin (800) 395-5220	Safe Drinking Water Act Excellence Award SC	Bill Brewer (336) 412-6395

Board of Trustees Committees

BOARD LIAISONS: John Kiviniemi (828) 225-8223

COMMITTEE	CHAIR/CONTACT #	COMMITTEE	CHAIR/CONTACT #
Archives & History	Terry Rolan (910) 384-5217	Government Affairs	Kenny Waldroup (919) 857-4540
Constitution & Bylaws	Chuck Willis (704) 338-4668	Nominating / Canvass	Rhonda Risher (919) 462-7510
Endowment	Les Hall (919) 614-2285	Sponsorship	Dave Zimmer (704) 342-4546
Finance	Brent Reuss (704) 548-8461	SONAR	Jackie Jarrell (704) 336-4460

Outreach Committees

BOARD LIAISONS: Chris Belk (919) 755-8637 Ivan Cooper (704) 927-4000 Bill Brewer (336) 945-1179

COMMITTEE (INITIALS REFER TO LIAISON)	CHAIR/CONTACT #	COMMITTEE (INITIALS REFER TO LIAISON)	CHAIR/CONTACT #
Outreach (B.B.)	Chris Windley (919) 233-8091	Water For People (I.C.)	Ilke McAliley (704) 338-6794
Public Education (C.B.)	George Simon, Jr. (704) 552-3886	Young Professionals (C.B.)	Melinda King (336) 412-6314

Membership Committees

BOARD LIAISONS: John Kiviniemi (828) 225-8223

COMMITTEE	CHAIR/CONTACT #	COMMITTEE	CHAIR/CONTACT #
Communication	Bob Griffin (800) 395-5220	Membership Services	Laurin Kennedy (704) 342-4546

Seminars & Workshops Committees

BOARD LIAISONS: Andy Brogden (919) 250-2737 Ivan Cooper (704) 927-4000 Bill Brewer (336) 945-1179 Brian Tripp (828) 327-6911 Chris Belk (919) 755-8637

COMMITTEE (INITIALS REFER TO LIAISON)	CHAIR/CONTACT #	COMMITTEE (INITIALS REFER TO LIAISON)	CHAIR/CONTACT #
Automation (I.C.)	Charles Fiero (910) 814-3074	Seminars & Workshops (A.B.)	Jon Lapsley (704) 342-4546
Disaster Preparedness (B.B.)	Mike Orbon (919) 716-0088	Small Systems (B.B.)	Jim Adams (828) 296-4500
Finance & Management (B.T.)	Karen Mills (919) 469-4110	Water Resources (C.B.)	Chad Ham (910) 323-4702
Industrial (I.C.)	Brian Eichlin (336) 852-4903	Water Reuse (C.B.)	Don Safrif (919) 233-8091
Residuals Management / Groundwater (C.B.)	Scott Carpenter (252) 917-4288	WW Collection & Water Distribution (A.B.)	Christine Nesbit (919) 787-5620
Safety (I.C.)	Dennis Parnell (919) 807-2603		

School Committees

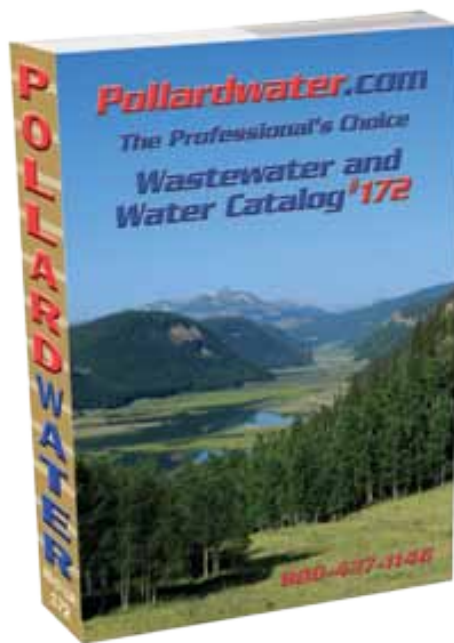
BOARD LIAISONS: Terry Houk (336) 883-3279 Andy Brogden (919) 250-2737 Bill Brewer (336) 945-1179 Brian Tripp (828) 327-6911

COMMITTEE	CHAIR/CONTACT #	COMMITTEE	CHAIR/CONTACT #
Collection/Distribution Schools (A.B.)	Geri Brown (704) 336-2858	Water Board of Education & Examiners (B.T.)	Thurman Green (919) 537-4224
Plant Operation & Maintenance (B.B.)	Mark Wessel (919) 787-5620	WW Board of Education & Examiners (B.T.)	Ken Vogt (910) 332-6586
Professional Wastewater Operators (T.H.)	T.J. Lynch (919) 662-5700	WW Treatment Operators Schools (T.H.)	John Dodson (919) 560-4384
Wastewater Lab Analyst (T.H.)	Glenn McGirt (336) 222-5133		

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NC AWWA-WEA

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Committee Reports

The following reports are based on information that was current as of August 14, 2011. For more up-to-date information refer to each committee's web page on www.ncsafewater.org or contact the committee chair directly. Contact information for all committee chairs is available on page 16 of this magazine, or on each individual committee's page of www.ncsafewater.org. If you are interested in joining a committee refer to the Volunteer Form on page 102 or contact the committee's chair.

Conference Planning Committee

Annual Conference Local Arrangements Sub-Committee

The program is finished and all arrangements have been finalized. The scanning process will be used again this year and Carolyn will begin taking volunteers in August. Scanning will take place in a room behind the registration desk to allow for uninterrupted work. Tim Lowder noted that the 2012 Annual Conference budget should reflect money for the Sunday night event since this year's funds have been transferred to the committee responsible for the Monday night Chair's Endowment Reception. Monday's traditional Opening Session will be replaced with an Operator's Session at 8:00am. The Operator's Session will include a brief welcome from the mayor, Pledge of Allegiance led by the moderator, and addresses from the visiting officers. The Operator's Session will be live streamed into another room to accommodate over-flow attendance. The Sunday night reception has been extended from 5:00pm to 8:00pm, the Chair's Endowment Reception will take place Monday night, and the traditional

Awards Banquet will be held Tuesday night with officer inductions before dinner and award presentations after dinner. At the end of August Richard will finalize transportation for the facility tours with a shuttle bus to the Great Wolf Lodge and charter bus to the National Whitewater Center. Facility tours are scheduled. Tours of the Great Wolf Lodge facility will be done as several small group tours. To better prepare for the tours, attendees will be able to sign-up as they register for the conference. The golf tournament deposit has been paid to Rocky River Golf Course and there are currently reservations for 60 players. A location has been selected for the clay shoot. A caterer is still needed for the clay shoot and a map to the location should be provided in eNews. Information for the conference brochure has been submitted and a schedule for email teasers has been developed. The Pipe Tapping and Operations Challenge Events will take place outside in a tent with bleachers provided. In an effort to work towards holding all five Operations Challenge events at the conference, the Lab event will be added this year. Sponsorships are still needed for Pipe Tapping and the Operations Challenge events. There will be volunteer ticket takers for Tuesday night dinner. An information booth with local area information from the CVE will be set-up across from conference registration.

2012 Spring Conference Sub-Committee

Mary Knosby will be 2012 Chair and Paul Shivers will be Vice Chair. The SC12 Call for Presentations was just released with papers due October 3 (a little earlier this year). An O&M track is planned again for 2012. The Spring Conference will be April 15-17, 2012.

Awards/History Committees

Bedell Award Sub-Committee

The committee has provided a recommendation for the award.

5-S Sub-Committee

A 5-S Nomination Form has been sent to each 5-S member whose address is listed in the NC AWWA-WEA 2011 Membership Directory & Buyer's Guide. Each 5-S member was asked to return a completed 5-S Nomination Form by July 15 if they would like to nominate a worthy candidate for consideration as a new 5-S member. Received forms will be distributed to committee members who will select up to five 5-S candidates for induction at this year's Annual Conference. The committee is on schedule to submit the names of those selected to Lindsay Roberts by the September 1 deadline.

Piatt/Maffit

Membership Awards Sub-Committee

NC AWWA-WEA staff will look up who qualifies at the end of the summer.

Kenneth J. Miller

WFP Award Sub-Committee

The committee will begin the process in September.

Board Committees

Endowment Committee

Four new members have been appointed to the committee; John Roberts, Chris Belk, Mike Osborne, and Brent Reuss. The Board of Trustees approved the revised Policies and Procedures for the Endowment, a new "Named Fund" and the plan for the Endowment submitted for the \$200,000 Endowment Fund Raising Initiative for 2011. There

will be 2 levels of recognition for individual donors and four levels of recognition for corporate donors. All individual and corporate donors making donations before September 30, 2012 will be recognized as "Founding Donors". Previous recipients of the Public Education Committee Carol Bond Scholarship have been contacted and asked to write a letter explaining how the financial assistance helped them. These testimonials will be used when discussing benefits with potential future donors. Training workshops for volunteer Fund Raisers will be held on June 20 in Charlotte and Greensboro and June 22 in Raleigh. The endowment has more than \$120,000 in cash in hand and pledges. Suggestions for tactics Fund Raisers could use were discussed based on initial contact committee members had with potential donors. A list of Frequently Asked Questions and answers will be developed to assist Fund Raisers in talking with potential donors. More updates are needed to the Pledge and Donor form. A final list of Fund Raisers and Potential Donors should be prepared by the end of June.

Government Affairs Committee

Kenny Waldroup has been keeping the committee updated on pertinent legislative agendas at the local, State and Federal levels and planning the new Legislative Water Day.

Nominating/Canvass Committee

The Bylaws, Nominating Process, Conflict of Interest Policy and composition of the current Board was emailed to the committee in June. A total of 4 nominations have been received to date. The Willingness to Serve forms are due July 31. A conference call is planned for the second week of August.

Sponsorship Committee

NC AWWA-WEA staff and the committee sent a letter to membership requesting their support. Through June 20 total sponsorship revenue generated is \$37,050.

Outreach Committees

Public Education Committee

Two Carol Bond Scholarship winners were identified at the university level. No community college applications were received.

A new poster advertising the scholarship was emailed to appropriate engineering/environmental departments an about 30 posters were hung in colleges/universities across the state. The committee provided judges to 8 of the 10 regional science fairs across the state. A core group of volunteers is being organized to help with the application process to bring the national Stockholm Junior Water Prize competition to North Carolina. Future issues to be discussed are the future of the funding of the Carol Bond Scholarship and the rebranding of the web site.

Water For People Committee

The 2 Annual Water For People 5k Fun Run took place May 7, 2011 and raised over \$5,400 after expenses were paid. There were approximately 90 runners and 10 company sponsors. Members are being offered opportunities to participate in fundraising activities and World Water Corp trips. Updating the web site is an ongoing effort to reach more members and enhance communication. Committee meetings are

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Committee Reports

being held in two locations with conference call participation available. The committee is contacting public schools to make presentations at the end of the school year in May. The committee is reaching new audiences with events such as Climb For Water, Geocache, and 5k Fun Run. There is increased member participation and enthusiasm for many different fundraising activities and the possibilities to get involved with the projects where Water For People serves. NC State

Engineers Without Borders students are attending Water For People committee meetings. The committee is teaming up with the Young Professionals Committee to host a happy hour event at BlackFinn Epicenter in Charlotte to raise money for Climb For Water.

Young Professionals Committee

An all day seminar will be held in Greensboro on July 19. Lunch seminars are being organized in Charlotte and Raleigh. The

Raleigh seminar is tentatively planned to take place at Burt's Bees in early August. Socials are being planned for the Charlotte and Raleigh areas. The Charlotte social may be a joint activity with Water For People. Adopt-A-Stream should take place in Raleigh and Charlotte in the fall. Ryan LeBlanc has volunteered as committee vice-chair next year. The committee is still in need of a volunteer to take the role of committee chair.

Membership Committees

Membership Committee

Non-members registered for the Spring Conference were sent an email inviting them to visit the Membership booth at the conference to receive a gift. There will be an industry newcomer's reception held at the Annual Conference. A membership booth was staffed at the Spring Conference, Eastern Collection & Distribution School and NCWOA School in Raleigh. Jana Stewart from the Young Professionals Committee joined the Membership Committee. The Board approved the bylaws for both the NCSU and UNCC student chapters. The slideshow has been updated for the Spring and Annual Conferences. Provided names of 11 members to the Communication Committee for consideration as featured members in the Member Portrait section.

Seminars & Workshops Committees

Seminars & Workshops Committee

Planning for 2011 and 2012 seminars continues. The first regional training event was held in Hickory on June 23 with strong content but lower than hoped for attendance. The committee will continue to work towards a successful regional event in Raleigh in August.

Wastewater Collection & Water Distribution Committee

Greensboro has offered to host a credit seminar sometime in September with a possible Collection System Management theme. The Collection System of the Year Award has been advertised and participation is encouraged. A chair is still needed for the Distribution System of the Year Award scheduled to start in 2012. A revised logo will be presented at the next meeting. Planning for the WEF CSC conference is going well with pre-registration numbers looking higher than last year's event in Phoenix. DWQ announcements include that

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Committee Reports

the deadline for the draft NPDES pesticide standard was extended and the draft Model Pre-treatment sewer use ordinance enforcement language requires comment. There is a need to promote committee awareness and recruit more members, especially from the western part of the state.

Finance & Management Committee

Since the last report that outlined a successful customer service seminar held in February 2011, the committee met by phone. As a result the next seminar agenda is complete and speaker confirmations are 95% complete for the August 11, 2011 'Effective Utility Management' seminar to be held in Greenville, NC.

Sustainability Committee

Randy Foulke and Vic D'Amato were elected as chair and vice-chair respectively for the next year. A budget of \$350 was recommended to include printing/ mailing of educational brochures, event meals and outreach activities. The February Sustainability Seminar was well received, but with low attendance. To improve attendance, moving the seminar to March next year is being discussed with the Seminars & Workshops committee. Scott Baranowski will take over the responsibility of developing the Clearinghouse. The committee is interested in being involved in attending the educational meetings of other committees and touring a facility. The Water Reuse and SAS Campus were suggested and will be looked into. The Needs Survey has been developed and after review by the committee a final version will be sent to NC AWWA-WEA staff for distribution. Vic D'Amato and Jeff Wing will start on the development of an educational sustainability brochure after the Annual Conference.

Water Resources Committee

A meeting was held February 9, 2011 and Jim Mead from NC DWR made a presentation on the Ecological Flow Science Advisory Board and Bill Holman discussed the final report on the Water Allocation Study. Don Safrit was designated as liaison to the Water Reuse Committee and Erin Wynia was designated as liaison to the NC LOM. Another meeting was held on April 14, 2011 and Drew Bartlett of Florida DEP spoke on the ongoing nutrient issues in Florida. Leila

Goodwin and Chad Ham are representing the committee as the liaison for the Tri-State Water Conference. At a meeting on June 7, 2011 Nancy Daly from NC DENR EEP reported on changes to EEP, Ken Nichols from CH2MHill presented on the technical aspects of hydro fracturing for gas extraction, and Rick Boilch and Thomas Slusser spoke on the environmental impacts and current state policy regarding hydro fracturing in NC. For the remainder of the year the committee will focus on scheduling speakers for meetings, monitoring legislation, submitting an Ecological Flows article to NC Currents, setting up a table at the Annual Conference and promoting the Tri-State Water Conference.

Schools Committees

Collection & Distribution School Committee

Results from the May water exam were reviewed and it was determined that coordinators would ensure that instructors receive the Math Syllabus and explain the matrix. Instructors will then only teach the parts of the matrix associated with the level they are teaching. Parking will be limited at the Morganton School so a shuttle will be provided between the Main Campus, Quality Inn, Sleep Inn and Hampton Inn and the school location. Instructors, coordinators and vendors will be able to park at the school location. The August and October school dates may be moved to more easily allow students to register for exams. The backflow sub-committee would like to store their equipment closer to the three school locations. They would also like to sell their current trailer and purchase a smaller one.

Plant Operations & Maintenance Committee

The Curriculum Sub-committee has completed development of all Core Competencies and Needs-to-Knows for all four class levels. Tentative dates are being discussed for 2012 schools. Nominations are being solicited for the Annual Maintenance Award. Applications will be included in the student packets for the biological and maintenance schools. The committee has had several successful outreach opportunities; O&M track at Spring Conference, liaisons to the Communication Automation and Schools

committees, POM chair met with WWBOEE Chair, and review of committee web pages.

Professional Wastewater Operators Committee

Eastern Region: May meeting was held in Angier on May 12. Lunch was served in the Angier City Council Chambers where the business meeting and presentation took place. Coley Price, Angier Town Manager, spoke on the topic of regionalization from the perspective of becoming a sewer customer to Harnett County and abandoning the Town's existing wastewater treatment plant. A tour of the abandoned facility and new sewer pump station followed the presentation. The August meeting will take place on the 18th at the Elm City WWTP.

Central Region: June 16 meeting was held at the Eden WWTP. Attendance at the meeting might be an all time high at 44 attendees. Melinda Ward was an excellent host and speaker on her efforts at the Eden WWTP. The September meeting will take place at the Graham WWTP.

Western Region: The meeting planned for July 7 at the Fourth Creek WWTP has been rescheduled for August 11 at the same location. The October meeting will take place at the Hendersonville WWTP.

Wastewater Board of Education and Examiners

A meeting was held May 19 and another is scheduled for July 19. Sub-committees are continuing their work in reviewing NTK's at the request of the TACU. Due to a scarcity of nominations in 2010 for the Collection System Operator of the Year Award new ways of communicating the award to the collections community are being considered. The committee is investigating the same plant level/same operator's grade regulation and will make a recommendation to the WPCSOCC for consideration. In preparation for 2012 the 2012 Work Plan, Budget and officers are being discussed. Discussions have begun with the Plant Operations & Maintenance Committee concerning future maintenance technologist certification and membership on the WWBOEE. Began discussions with the Collection & Distribution Schools committee concerning their current revisions to their Math Syllabus and it relates to math requirements being established within the Collection Systems NTK. [EZ](#)

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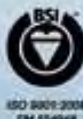


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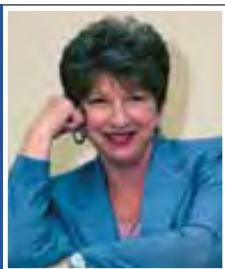
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Portrait of



Linda Vaughn: A Life in Public Education and Customer Service

For almost 30 years, Linda Vaughn has dedicated her life to public education and customer service, two activities that work hand-in-hand in promoting the importance of water conservation. In her work with the Orange Water and Sewer Authority (OWASA), Vaughn helped distribute the WEF Water Sourcebook curriculum for teachers, created and ran conservation ads in local newspapers, recruited and served as a judge for school science fairs, and occasionally took senior citizens to the Cane Creek Reservoir for a picnic. And that was only part of her job!

Vaughn recalls: "On my first day of work, Mr. Everett Billingsley, the Executive Director of OWASA welcomed me, introduced me to the employees in Customer Service and then told me that he had registered me for an AWWA Customer Service Conference in Virginia."

The expectation that customer service and community relations would improve, and the support to make change happen, prompted Vaughn to develop both customer service and public education programs for the utility's customers. On paper, her job focused on managing a team consisting of customer service representatives, cashiers, meter readers, a field service supervisor, a receptionist and a communications specialist, as well as being the end of the line for customer complaints. In reality, the job involved much, much more.

"I was very fortunate to work for a person who was not only a mentor but a strong supporter," explains Vaughn. "This allowed me to try some new and interesting things that other utilities were not doing."

While at OWASA, she developed and launched a public education and outreach program that included a monthly customer newsletter, *The Blue Thumb*, an employee newsletter, *Thumbprints*, 30-second radio ads on WCHL called *Enviro-minutes*, presentations to civic clubs, and conservation education to third-graders in the Chapel Hill-Carrboro Schools. Design, printing and distributing of countless bookmarks to school and public libraries as well as sponsorship of a water conservation poster contest delivered important conservation messages to youngsters. They in turn would take the messages home and remind Mom and Dad to only run the dishwasher if there was a full-load or turn the water off when brushing their teeth.

The combination of many activities helped OWASA build a good

working relationship with their customers and the media, while establishing a good citizen reputation with the business community. At the same time, Vaughn was also working with other NC AWWA-WEA utility volunteers to establish a North Carolina Public Education committee. After that was accomplished, she moved her sights to the national level and, with the help of her friend Jack Waters of Chesterfield Virginia, petitioned the AWWA Management Division to establish a national committee. She recalls: "For me that was a tremendous accomplishment for it recognized customer service and the employees who have direct contact with customers as a vital and valuable part of this industry."

Before OWASA, Vaughn was Public Relations Director for a non-profit health agency. That experience taught her the importance of "telling your story" and "raising awareness of the issues and challenges you are working to address." "If frontline staff are not trained in the people and conflict management skills needed to handle customer inquiries, they are ill equipped no matter how sophisticated the technology available to them," she explains. This drive to educate frontline employees and provide training in communication and people skills is what inspired Vaughn to volunteer for the committee responsible for exploring the development of an AWWA Customer Representative Certification Program. As one of approximately 40 approved trainers world-wide, Vaughn is the only AWWA approved trainer on the east coast of the US.

The plaques on Vaughn's office wall recognize her service as NC AWWA-WEA Secretary to the Board, Director to WEF, and Chair of the WEF Public Education Committee. Other accolades included the President's Award, Arthur Sidney Bedell Award, and Moffitt and Piatt Membership Awards for member recruitment.

She has never missed an opportunity to promote the organization or the value of the work it does. Currently, she has a small consulting practice that focuses on communication and customer service skills building. Her work includes assessments, process mapping, customized training and coaching. With clients consisting primarily of utilities, Vaughn continues to be closely linked with the work that has fueled her passion for almost three decades. As she knows only too well, building customer service skills is one of the best ways to promote the importance of an industry and a resource that, more than ever, depends on public support. [↗](#)



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Portrait of



Jean Creech: A Passion for Education

When she gives a presentation at a local school, Jean Creech likes to use the ‘ooh’ factor to get the students’ attention. Take for instance, the fact that North Carolina’s largest wastewater treatment plant (WTP) is located right next to one of the state’s biggest malls. She asks students: “When you wash your hands or flush the toilet, where do you think all the water goes? She pauses for effect then continues. “Do you know where the Carolina Place Mall is?”

Once she brings it down to that level, Creech finds that students quickly become engaged. Whether it is interacting with elementary children during a poster contest or middle school students at a science fair, it is clear that she loves working with children. “Until I started volunteering with the Public Education Committee, I never had the opportunity to go into classrooms and talk about careers in water and wastewater,” she says. “That has been really exciting for me.”

Creech joined the Public Education Committee (PEC) in 2005 a little more than a year after she started working for a large national biosolids management company in technical services and public education (after a 6-year hiatus from the biosolids field). Her volunteer work with the NC AWWA-WEA was a perfect fit.

She was asked to join a Task Force mandated with getting the PEC working in a new direction. The Task Force developed a strategic plan to address several different areas: encouraging careers in water; engaging different audiences in water conservation; and, educating the public on how to keep our water clean.

When defining its audience, the Task Force looked not only at the general population, but also at students, right from elementary school to the bachelor’s level. Creech points out that not all students

want to go to college. The advantage of a career in water and wastewater is that many employees can acquire a highly technical skill set while working. “Once you get into the field there are so many opportunities,” notes Creech.

Building awareness is the first step towards encouraging both water-related careers and general habits of water stewardship. Creech is involved in many initiatives that do just that. One event, targeted at elementary students, is a poster contest held during NC AWWA-WEA’s annual Drinking Water Week. “One teacher not only had her students draw pictures, but she also had them write stories,” recalls Creech.

The PEC has also targeted North Carolina students from elementary to high school at the regional science fairs, forming a cadre of volunteers to judge water-related entries. Creech is one of those judges. “One of the most satisfying experiences of my career,” she says, “is when I told a ten-year old child he had won our science fair prize of fifty dollars. He looked up at me and his little face just lit up.”


Creech points out that NC AWWA-WEA participation in the fairs benefits not only the students but also the coordinators who are also teachers in the school system. It also adds a different dimension to the fairs, giving students who might not otherwise win a prize, a measure of recognition that might encourage them to continue in water and wastewater. In fact, it is not unusual for PEC

members to see the same students competing at the high school level.

For those students, the PEC supports the AWWA’s Stockholm Junior Prize. Up to four years ago, the State of North Carolina had never sent a candidate to compete for the national prize. “The second year we sent a candidate, she was the national winner,” notes Creech. “The candidates we are sending are well prepared.” In fact, this year’s NC candidate finished in the top ten.

The PEC also vets students for awards at the university (undergraduate) or community college level: the Carol Bond Memorial Scholarship. Under the terms of the award, money also goes to teachers throughout the state who need funding to put together water-related projects for their class.

Of course, teachers can also ask volunteers such as Creech to come in and they often do. In the classroom, she likes to draw from her daily work with the City of Charlotte to illustrate her lessons about wastewater and biosolids reuse.

Recently, Creech joined the City as residuals technical services manager, overseeing the ISO 14001 certification for two WWTPs as well as dealing with biosolids and alum residuals. She often brings pelletized products from her biosolids work into the classroom. She hands them out for inspection while emphasizing the importance of biosolids to local agriculture. “That’s my ‘ick’ factor,” she laughs. “I am very fortunate,” she adds. “This is the culmination of all I love in my career, put into one package!” 

“Until I started volunteering with the Public Education Committee, I never had the opportunity to go into classrooms and talk about careers in water and wastewater. That has been really exciting for me.”



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WATER CERTIFICATION QUESTIONS

1. Many cross-connections, created by individuals who are unaware of the hazard, are made simply as a matter of _____, with no regard of the potential problem.
2. The two most common methods for setting up valve and hydrant maps are the _____ and _____.
3. _____ pumps do not generate any suction when dry, so the impeller must be submerged in water for the pump to start operating.
4. A major disadvantage of starting and stopping centrifugal pumps as a means of controlling output is _____.

Answers:

1. Convenience: page 302, WSO: *Water Transmission and Distribution*, 3rd Edition
2. Plat-and list method, intersection method: page 452, WSO: *Water Transmission and Distribution*, 3rd Edition
3. Centrifugal: page 351, WSO: *Water Transmission and Distribution*, 3rd Edition
4. Excessive motor wear: page 353, WSO: *Water Transmission and Distribution* 3rd Edition

WASTEWATER CERTIFICATION QUESTIONS

1. Which of the following would be the most useful to an operator to avoid anaerobic digester upsets?
a) pH
b) percent of volatile solids
c) alkalinity
d) volatile acids/alkalinity ratio
2. Given the following data, calculate the primary effluent BOD.
Data: F/M = 0.4, Influent flow = 1.0 MGD, MLVSS = 3,000 lbs
a) 112 mg/l
b) 128 mg/l
c) 144 mg/l
d) 162 mg/l
3. A lab analysis indicates that an aerated grit chamber is removing 20% of the volatile solids of the incoming influent. An operator should:
a) do nothing
b) reduce velocity of wastewater through grit chamber
c) increase velocity of wastewater through grit chamber
d) decrease aeration
4. Which of the following parameters should not significantly be affected in a primary clarifier?
a) BOD
b) pH
c) total suspended solids
d) scum/floatables

Answers:

1. D. volatile acids/alkalinity ratio
2. C. 144 mg/l
3. C. increase velocity of wastewater through grit chamber
4. B. pH

CERTIFICATION INFORMATION

If you have any questions regarding operator/engineering certification and exams please contact the appropriate agency.

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Imagine the result



Plant Spotlight: Archie Elledge Wastewater Treatment Plant

Winston-Salem/Forsyth County Utilities Commission, Winston-Salem, NC

Article based on information provided by Chris Shamel, City of Winston-Salem and edited by: David Hamilton, PE /Malcolm Pirnie/ARCADIS (NC AWWA-WEA Plant Operations & Maintenance Committee).



The City of Winston-Salem, located in the Piedmont Region of North Carolina, provides sewer service to its citizens as well as neighboring communities in Winston-Salem and Forsyth County with two wastewater treatment plants (WWTP) publicly-owned and operated by the Winston-Salem/Forsyth County Utilities Commission: the Archie Elledge WWTP and the Muddy Creek WWTP. The Elledge WWTP treats wastewater for a service population of roughly 115,000. The Elledge WWTP, designed for 30 MGD ADF, receives an average sewer flow of 18 MGD and peak flow of 45 MGD. Wastewater flow is generated by domestic customers, food and beverage processing facilities, textile manufacturing facilities, and metal finishing facilities. The Elledge WWTP is an activated sludge plant that began operation in 1958 with headworks and primary treatment upgrades in 2009 that will ultimately allow 100 MGD influent capacity. The annual plant operating budget is nearly \$7.5 M.

All flow comes into the influent pump station and passes through three coarse bar screens and two vortex grit systems. Carbon scrubbers capture odors off of the preliminary treatment structure. Flow is pumped to four 120' diameter circular clarifiers where settled solids are pumped

to six anaerobic digesters and grease is consolidated for disposal. Odors scrubbers capture odors coming off the primary clarifier overflow weirs. Flow is distributed to six activated sludge basins and then to six secondary clarifiers. Waste activated sludge is sent to two gravity-thickening belts and then to the anaerobic digesters. Process flow continues to chlorine contact chamber for disinfection with sodium hypochlorite and then dechlorinated with sodium bisulfite before entering receiving stream, Salem Creek, a tributary to the Yadkin River. The plant power source is backed up by three stand-by generators.

Primary and waste activated sludge solids are anaerobically digested. Biosolids from digestion at Archie Elledge are combined with digested biosolids pumped from Muddy Creek WWTP into two blending tanks. Biosolids from blending tanks are run through centrifuges to achieve 21-23% Total Solids (TS) cake. The cake is pumped to a thermal biosolids dryer which produces a 96% TS "Class A Sludge" pellet. These pellets are applied as an agricultural soil amendment through a contracted distributor. Alternately, these pellets can be placed in a landfill when necessary.

The SCADA system (Modicon/WonderWare) provides complete plant monitoring and control.

The biggest challenge presented to the Elledge facility in recent years has been the condition and reliability of the existing influent pumping station, intermediate pumping station, headworks, and primary clarifiers which had deteriorated over time due to age and hydrogen sulfide corrosion. The concrete in the intermediate pumping station deteriorated to the extent the operating areas had to be abandoned due to safety concerns related to the high potential for structural failure. To address these issues and prepare the Elledge WWTP to serve the City of Winston-Salem and surrounding communities well into the future, the Winston-Salem/Forsyth County Utility Commission authorized the a project to design and construct new influent pumping, headworks, and primary clarification facilities. (See photo).

The cornerstone of the new preliminary treatment facilities is a consolidated influent pumping station consisting of coarse screening, vortex grit removal and dry-pit immersible pumping units sized for a peak instantaneous flow of 100 mgd. The pumping system uses a unique confined inlet style wetwell design to eliminate solids deposition and optimize pump hydraulics. The facility includes full odor treatment systems to prevent deterioration and minimize nuisance odors. New 120 ft primary clarifiers, new plant control building, primary sludge pumping station with scum concentrator, and new plant power generation and distribution facilities were included in the improvements. The new facilities were successfully placed into service in January 2011.

The plant staff includes twelve operators and five administrative personnel. There are six laboratory staff for the plant. The Utilities Commission encourages its employees to attain the highest levels of certification possible and supervisor training is offered. All operators are required to obtain Grade II WWTPO cer-



Aerial photo during headworks and primary treatment construction

tification to maintain their positions. Senior operators must have a Grade III WWTPO certification. Supervisors must have a Grade IV WWTPO certification.

The Utility Commission is actively promoting the Certified Maintenance Technologist program offered through NC AWWA-WEA. Several maintenance employees have recently achieved their Class I, Class II, or Class III Maintenance Technologist certifications.

Safety training is provided through the City of Winston-Salem's training department. The city trains personnel on specific safety issues related to wastewater treatment, such as Lock-out/Tag-out, confined space entry, laboratory safety, and personal protective equipment requirements. The training also covers general safety topics associated with all municipal operations.

Among other distinctions, the proud staff at the Elledge WWTP is a recipient of the 2009 Annual Air Quality Award; one example of their continued commitment to quality service for the citizens of Winston-Salem/Forsyth County. [nc](#)

Contact: Frank Crump, Utility Plants Superintendent
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91st Annual Conference

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91st Annual Conference NC AWWA-WEA

Fall is here and excitement is building for North Carolina's largest and most important gathering of water and wastewater professionals - the NC AWWA-WEA Annual Conference! The Association's **91st Annual Conference will be held November 13 - 16, 2011 at the Embassy Suites Charlotte-Concord Golf Resort, Spa and Convention Center in Concord, NC.** This conference is North Carolina's primary forum where industry decision-makers, and others involved in the water and wastewater industry gather to exchange fresh ideas and share proven successes. At this year's conference, attendees will learn from informative and interesting technical sessions, network at the many social events and, of course, enjoy visiting with leading edge companies in the exhibit hall.

Concord, the host city, is best known for its unequalled concentration of motorsports attractions, from the Charlotte Motor Speedway and zMAX Dragway to Hendrick Motorsports. The Embassy Suites Charlotte-Concord offers easy access to nearby Great Wolf Lodge indoor water park and Concord Mills Mall, a 1.4 million square foot shopping mall touted as one of North Carolina's largest tourist attractions. Concord's proximity to I-85 puts it in the heart of the highest growth corridor in North Carolina and just a short drive away from all the amenities of Charlotte, North Carolina's largest city. Charlotte is a community rich in captivating culture, colorful cityscapes and cosmopolitan character.

Seasoned conference attendees should keep their eyes open for the notable changes made to the traditional confer-

ence schedule. Make sure to check out the information on the Chair's Dessert Reception, a free and fun event, which will be held on Monday night to help raise funds for the Association's Endowment Fund.

Join us on Sunday, November 13 to kick-off your conference experience with one of two great recreational events. Set your sites on a day of sporting clays or choose to tee-off in our annual golf tournament. We look forward to seeing you!

Hunting Creek Preserves will host the **SPORTING CLAYS EVENT**. Hunting Creek has a 13 station sporting clays course which offers more than a mile of trails. The course meanders through various elevations before ending on a lowland next to a stream. Each of the stations on the course are located well out of sight of the previous station and are equipped with two Promatic traps and operated with push button ease. A 45-foot tower adds greater variety to the sportsman's clay experience. This event includes 100 targets and lunch for a fee of \$70 per person. Lunch will be sponsored by Willis Engineers and Tencarva Machinery Company.

The **GOLF TOURNAMENT** will take place at **Rocky River Golf Club** (www.rockyrivergolf.com), currently rated in the Top 100 Golf Courses in North Carolina, and located adjacent to the conference center. The course features 18 sensational holes carved out of beautiful rolling hills and natural wetlands. Registration will begin at 11:00am with a shotgun start at 12:00pm. The golf package has been reduced in price this year to \$70 per golfer, and includes a round of golf, box lunch and prizes. Sign up

your team or come as an individual.

The **EXHIBIT HALL** will be filled with over 100 vendors eager to share their knowledge with attendees, and there will be ample time to talk with this year's more flexible conference schedule. The exhibit hall will open Sunday evening at 5:00pm with an extended reception and buffet dinner where we will induct new members into 5-S, and present the Golden Manhole Awards.

On **Monday and Tuesday Continental Breakfasts** and **buffet-style lunches** will be served just outside the exhibit hall with tables scattered throughout the exhibit hall so you can conveniently stop and talk as you eat. Another **Social** will take place in the exhibit hall on Monday from 6:00pm - 7:00pm with complimentary hors d'oeuvres, sodas and a cash bar.

As you plan your conference attendance you will want to make sure you are present in the exhibit hall for the six **door prize drawings** that will take place Sunday through Tuesday giving every attendee multiple chances to win great prizes donated by our exhibitors. Door prize tickets are included in attendee registration.

As if the information, food, awards and prizes weren't enough to pull you into the exhibit hall, there is one more great reason - friendly competition. The Young Professionals Committee is bringing their popular **Wii Challenge Event**, first introduced at the Spring Conference, to the larger venue of the Annual Conference. This fun event is open to all conference attendees and allows them to play Wii Sports Games for chances to win the Wii System used in the competition. Exhibitors



will also be able to get in on the competitive atmosphere with a 'Best in Show' award. Criteria for this new award will be announced closer to the conference.

With so much to do inside and outside of the exhibit hall, don't forget that the exhibit hall will close on Tuesday at 1:20pm before the end of the conference.

At the core of everyone's conference experience is the **TECHNICAL PROGRAM**, and this year's line-up won't disappoint. The program will begin on Monday morning with the **Operator Celebration** from 8:00am to 9:00am, replacing the traditional Opening Session. We are fortunate to have in attendance national officers Jerry Stevens (AWWA President) and Sandra Ralston (WEF Trustee) and time will be set aside during the Operator Celebration to hear their remarks on the state of the industry. In celebration of our operations personnel, operator awards will be presented during the Operator Celebration.

The remainder of Monday and all of Tuesday will be filled with thirty-minute **technical sessions** – more than ever before with sessions being offered all day! Technical session tracks include water, wastewater, collection & distribution, policy & management, and special topics. A five-minute break between presentations will allow attendees to move easily between session tracks and hear the presentations that most interest them.

Wednesday's program will consist of a **forum** entitled '*Security and CyberSecurity – Securing Our Water and Wastewater Infrastructure in a Post 9/11 World.*'

Continuing Education Units will be offered for the Operator Celebration, technical sessions, forum, and facility tours. Details on how to ensure you receive credit are available in the Annual Conference Registration Brochure and instructions will be available again at the conference. (*Full Technical Program is available on pages 40-41.*)

We are very excited to offer two unconventional **FACILITY TOURS** to water parks in the area! Great Wolf Lodge and the US National Whitewater Center have both agreed to take us through their

facilities and give us a behind the scenes look at what it takes to keep the fun rolling. Both tours will take place on Monday afternoon, and attendees will meet at a convention center entrance at 1:00pm to load buses to the facility of their choice. New this year, to assist with planning for the tours, attendees must sign-up for a tour before the start of the conference. Sign-up is free and available as a part of conference registration. Since the tours take place simultaneously, it is only possible to attend one tour.

The Great Wolf Lodge is North America's Largest Family of Indoor Waterpark resorts, and the ultimate destination for your next family getaway. At Great Wolf Lodge, the star of the Great Wolf Lodge is the indoor waterpark. With 12 huge slides, 3 pools, giant water fort and more, it's a howlin' good time for the whole family, and as if that weren't enough, they've got an enormous outdoor pool too. This tour will be conducted in small groups at staggered times and offers an insider's look at the inner workings of this great facility. Did you know that The Great Wolf Lodge reclaims approximately 90% of the laundry water used at the facility? This water reclamation system treats approximately 25gpm and includes lint removal and a filtration system. Water for the waterparks, which hold over 500,000 gallons in the park's various pool areas, is continuously re-circulated through individual systems for each of the five pool areas consisting of multiple pumps, filtration UV disinfection and chemical addition. The pumping system(s) capacity is 20,000gpm.

The U.S. National Whitewater Center (USNWC) is the world's premier outdoor recreation and environmental education center. Alongside mountain-biking and running trails, a climbing center, and challenge course, the park's unique feature is a multiple-channel, customized whitewater river for rafting and canoe/kayak enthusiasts of all abilities. The "river" channels hold a total of 12 million gallons. Seven 620 HP vertical turbine pumps rated at 80,000gpm lift the whitewater 21 feet from a lower pond to an upper pond on

a continuous basis. A portion of the "river" water is filtered at a rate of approximately 8000gpm using a 300micron SS filter system. The filters are backwashed 12 times a day and generate approximately 3500 gallons per backwash.

The popular **PIPE TAPPING & OPERATIONS CHALLENGE EVENTS** will take place on Monday in a tented area outside of the Concord Terrace. In addition to last year's Collections Systems Event and Pump Maintenance Event, the Operations Challenge will be expanded to include a new Laboratory Event. During the Laboratory Event, teams will perform all steps of an E. Coli membrane filtration analysis using Hatch products following all method requirements and aseptic techniques as outlined in the Hatch m-ColiBlue24 method and using Standard Methods 9222B (18,19 & 20th ed), section 1,3,5a,5b, & 6 as a reference for the filtration method.

Students are encouraged to attend and get a jump-start on their career by participating in our **STUDENT ACTIVITIES**. To make conference attendance a little easier, students are eligible for the **Student Registration Rate** of \$45.

Students involved in research related to water resources topics will want to enter the **Student Poster Contest** and show-off their work to others. The poster contest will take place on Monday with posters displayed from 8:00am to 5:00pm and students present for posters to be judged from 1:45pm – 2:45pm. Monetary prizes will be awarded for first, second and third place posters. The deadline to enter posters into the contest is November 1.

Since one of the most beneficial aspects of conference attendance is network building and making contacts, the **Student Guide Program** gets students started by pairing them with an established professional to answer questions, show them around the conference, and introduce them to others in the industry. The **Student Appreciation Lunch**, which is included with the special Student Registration Type, is also a great place to meet students from other schools and professionals interested in getting the next generation involved.



Join us for the **CHAIR'S DESSERT RECEPTION** Monday Night at 8:30pm at the Rocky River Terrace for an evening of fellowship and philanthropy. The evening's events will include live bluegrass music, a live auction, and a campfire with s'mores. All auction proceeds will benefit the NC Safewater Endowment Program, which provides for scholarships and educational awards to promote the sustainability of water professionals in our industry. Be prepared to bid on some amazing auction items for a great cause.

The Annual Conference shines the spotlight not only on the water/wastewater industry as a whole, but more specifically on NC AWWA-WEA, and Tuesday afternoon and evening highlight the inner workings of the Association and the committees and people that make it work. Starting with the **GAVEL GALA, AWARDS RECEPTION AND COMMITTEE FAIR** at 5:30pm you can sit in on the Annual Business meeting, witness the installation of the 2012 Board of Trustees and the formal passing of the gavel as well as congratulate those earning membership awards and winning contests that took place during the conference. After the conclusion of the formal events, mingle among the com-

mittee display tables and learn about the role each committee plays in the Association – you may even find a new way to get involved! The official **AWARDS BANQUET** will get started at 7:00pm and will honor several outstanding people in our industry.

The conference will wrap-up Wednesday morning with the **BEST TASTING WATER CONTEST** at 11:00am. All utilities are invited to submit a sample and see how the taste of their drinking water measures up to the taste of others in the state. A panel of volunteer judges will rank individual samples and results will be combined to establish the overall rankings. Awards will be given for first, second and third place. In order to participate, samples must be turned in at the conference registration desk by 5:00pm on Sunday, November 13.

Make the most of your conference attendance and stay on-site at the **Embassy**

Suites Charlotte-Concord. In addition to comfortable rooms (at a special discounted rate) you can enjoy casual, on-site dining at the Rocky River Grille, golf at the Rocky River Golf Course or a range of relaxing services at Spa Botanica. In order to take advantage of the special room rate of \$131.00 (plus tax) per night reservations must be made by October 22, 2011.

You can count on this year's conference to offer professional development, exposure to the industry's best tools, tips and technologies and networking opportunities, for unbridled professional learning, networking and fun. Everyone is encouraged to attend and learn more about NC AWWA-WEA. If you are not already a member, considering joining AWWA, WEF or NC SLAM to take advantage of the benefits these organizations offer as well as a discounted conference registration rate.

Countdown to the Conference

- October 22** Last date to make hotel reservations at the discounted group rate
- October 31** Last day to register at the Regular Registration Rate
- November 4** Last chance to pre-register for the conference and refund request deadline
- November 13** Conference Registration Desk opens at 12:00pm & Exhibit Hall opens at 5:00pm

What's New in 2011...

- Buffet-style dinner in the Exhibit Hall on Sunday.
- Operator Celebration Monday morning replacing the traditional Opening Session.
- Monday & Tuesday – ALL SESSIONS, ALL DAY! A buffet lunch will be served from 11:30am – 1:20pm both days. Choose when you take a break for lunch!
- Early sign-up required for facility tours.
- Chair's Dessert Reception on Monday Evening.

Look Online For...

- Annual Conference Registration Brochure
- Online Registration for Attendees & Exhibitors
- Hotel Reservation Instructions
- Golf Tournament & Clay Shoot Registration
- Up-to-date list of exhibitors and map of the exhibit hall
- Instructions for entering a Pipe Tapping or Operations Challenge team
- Detailed instructions for entering the Best Tasting Water Contest

Exhibit & Sponsorship opportunities may still be available. Visit www.ncsafewater.org or call the NC AWWA-WEA office at (919) 784-9030 to learn more.

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Sunday, November 13	
11:00am	Golf Tournament
11:30am	Clay Shoot
12:00pm - 6:00pm	Conference Registration Desk Open
12:00pm - 7:00pm	Committee Display Tables
5:00pm - 8:00pm	Exhibit Hall Open
5:00pm - 8:00pm	Exhibit Social & Buffet Dinner (5S and Golden Manhole Induction at 7:30pm)
Monday, November 14	
7:00am - 8:30am	Continental Breakfast
7:00am - 6:00pm	Conference Registration Desk Open
7:00am - 7:00pm	Committee Display Tables
7:00am - 7:00pm	Exhibit Hall Open
8:00am - 5:00pm	Student Poster Contest
8:00am - 9:00am	Operator Celebration
9:15am - 5:10pm	Technical Sessions
9:30am - 12:00pm	Operations Challenge, Laboratory Event
11:30am - 1:20pm	Association Buffet Lunch
12:00pm - 1:45pm	Student Lunch
1:00pm	Facility Tours
1:15pm	Pipe Tapping Contest & Operations Challenge
3:00pm - 3:30pm	Afternoon Break
5:15pm - 6:00pm	Industrial Reception
5:15pm - 6:00pm	Industry Newcomer's Reception
6:00pm - 7:00pm	Social Hour in Exhibit Hall
8:45pm - 10:30pm	Chair's Endowment Dessert Reception & Auction
Tuesday, November 15	
7:00am - 8:00am	5S Breakfast (5S Members Only)
7:00am - 8:00am	Continental Breakfast
7:00am - 1:20pm	Exhibit Hall Open
7:00am - 1:20pm	Committee Display Tables
7:30am - 5:30pm	Conference Registration Desk Open
8:00am - 4:50pm	Technical Sessions
9:40am - 10:15am	Morning Break
11:30am - 1:20pm	Association Buffet Lunch
2:15pm - 2:45pm	Afternoon Break
5:30pm - 7:00pm	Festivities/Gavel Gala
7:00pm - 10:00pm	Awards Banquet
Wednesday, November 16	
7:30am - 8:30am	Coffee
8:00am - 11:30am	Conference Registration Desk Open
9:00am - 11:00am	Forum
11:00am	Best Tasting Water Contest

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Monday, November 14, 2011					
8:00 am - 9:00 am	OPERATOR CELEBRATION				
TIME	WATER	WASTEWATER	COLLECTION & DISTRIBUTION	SPECIAL TOPICS	POLICY & MANAGEMENT
9:15 am - 9:45 am	Controlling NDMA and Emerging Contaminants	Managing Seasonal Sewer Flows with a Plan Based on Averages			If It Ain't Broke -- Fix It
	<i>William B. Dowbiggin, P.E., BCEE, CDM</i>	<i>Gus Simmons, PE Cavanaugh & Associates, P.A.</i>			<i>Jolene G. Northrop, P.E., CHA</i>
9:50 am - 10:20 am	D/DBP Precursor Removal – What You May Have Missed	Enhancing Biogas Utilization by Combined Heat and Power and FOG Processing at the McAlpine Creek WRF	Total Cost of Storage Tank Ownership	Lean Processes Score in Lean Times	Municipality Size Does Not Matter - NC Small Town Asset Management Program
	<i>David Hamilton Malcom Pirnie / Arcadis</i>	<i>K. Richard Tsang, Ph.D., P.E., BCEE, CDM</i>	<i>Gregory R. Stein, P.E. Tank Industry Consultants</i>	<i>Robert Pearson, PE US Infrastructure of Carolina</i>	<i>Wayne Francisco GHD</i>
10:25 am - 10:55 am	The Thomas WTP - An ORC's Experiences Before, During, and After Reconstruction	Piedmont WWTP - a 4 MGD Greenfield Membrane Bioreactor Facility	Providing Surge Tank Protection for Small Water Systems – Two Case Studies	Baseline Asset Management Plans For Wastewater Collection and Water Distribution System Linear Assets as A Guide To Investment Decision Making – A Case Study	Infrastructure Solutions for North Carolina
	<i>Kenny Adkins Winston-Salem</i>	<i>Will King Jacobs</i>	<i>Larado Robinson Draper Ayden Associates</i>	<i>Shiv Iyer GHD Consulting Engineers</i>	<i>J.D. Solomon CH2M Hill</i>
11:00 am - 11:30 am	A Tale of Two Cities – Updating Ozone at Raleigh and Wilmington	Energy Saving Aeration Control for Nutrient Removal	North Bank Crabtree Interceptor Rehabilitation	Business Continuity Plans: What They Are, Why Utilities Should Prepare Them, and How To Get Started	Facing Utility Challenges - Fast Tracking the Implementing of an Asset Management Program
	<i>Jeff Coggins, PE Black & Veatch</i>	<i>Sean Scuras, PE, PhD Tetra Tech</i>	<i>Michael Wicker, PE Withers & Ravenel</i>	<i>Jack Moyer URS</i>	<i>Celine Hyer, PE Malcom Pirnie/Arcadis</i>
11:35 am - 12:05 pm	"Plant Optimization" Greensboro's Preparations for Meeting Stage 2 DBP Rules for 2012	"Stinkology" - What To Do When Odor Issues Move	Bringing Water to America's Lost Colony – A 56-Mile Expansion of Roanoke Island's Water Distribution System	A Tale of Two Reservoirs: Emergency Action Planning for Twin Reservoirs in a Highly Urbanized Area	
	<i>Barry Parsons City of Greensboro</i>	<i>John Hahn Union County</i>	<i>Michael K. Sloop, P.E. CDM</i>	<i>George Eller, P.E. Hazen and Sawyer</i>	
12:10 pm - 12:40 pm	Modeling of a flow through UV-LED reactor using Computational Fluid Dynamics (CFD)	Aeration System Design for Energy Savings			
	<i>Mohammad Arafin NC State</i>	<i>Gregory Duffy Biochem Technology</i>			
12:45pm - 1:15 pm	Water for the Future CFPWA's Integration of Water Resources	Energy-Efficient, Maintenance-Friendly, Large Bubble Mixing Systems	Designing Your Pipeline for 100 Years or More; can it be cost-effective?	Innovative Wastewater Treatment and Reuse in an Arid Environment	Putting Your Money Where Your Need Is: Implementing an Asset Management-Focused CIP
	<i>Mike Richardson CFPWA</i>	<i>Stuart Humphries EnviroMix</i>	<i>Ahmad Habibian Black & Veatch</i>	<i>Ivan A. Cooper Golder Associates NC</i>	<i>Ryan Nagel Malcom Pirnie/Arcadis</i>
1:20 pm - 1:50 pm		Not Just Blowing Hot Air: Lessons Learned From Turbo Blower Upgrades for Energy and Operational Efficiency	Saving Utilities Money by Being Proactive on Roadway Projects	Leveraging Current WWTP SCADA Investments To Provide Greater Value Today	Development of an Asset Management Plan for the Piscataway Wastewater Treatment Plant of the Washington Suburban Sanitary Commission
		<i>Joshua Norton, P.E., BCEE CDM</i>	<i>Bert Becton, P.E. Jacobs Engineering Group</i>	<i>Glendon Fetterolf HDR</i>	<i>Mert Muftugil GHD Consulting Engineers</i>
1:55 pm - 2:25 pm	Completion of Construction, Start-up, and Initial Water Quality Data Collection of 6.75 MGD MIEX Facility in Johnston County WTP	Substantiated Savings: The Untold Story of Turbo Compressor Performance Verification	A Step-Wise Approach to Asset Management	Defining and Enhancing the Safe Yield of a Multi-Use, Multi-Reservoir Water Supply	Working with Your Customers Crafting Good Customer Service Policies
	<i>Russell Jones Hazen & Sawyer</i>	<i>Curtis Rogers Siemens Turbo Machinery</i>	<i>Jeff Stillman, Black & Veatch</i>	<i>Mary Knosby, P.E. HDR</i>	<i>Steve Miller CMUD</i>
2:30 pm - 3:00 pm	"Business Analysis" as a Means for Achieving Cost-Effective Water Service Delivery	Handling Fats, Oils, and Greases at WWTPs	Asbestos Cement Pipe: What if it Needs to be Replaced?	Stop the Madness! – Get Control of Your SCADA System Alarm	Policy Based Decision Making in the Developing Union County's Comprehensive Master Plan
	<i>John Huber Charlotte-Mecklenburg Utilities</i>	<i>Robert Forbes CH2M Hill</i>	<i>Eric Williams, P.E; HDR</i>	<i>Philip Gaberdiel Westin Engineering</i>	<i>Ed Goscicki Union County</i>
3:30 pm - 4:00 pm	Getting Ahead of the Regulations: Advanced Treatment Technologies for Dealing with Emerging Contaminants in Water	Impaired Waterways Determine Fate of Paulding County, Georgia	Summer's Coming: Odor Control Needed Fast	LEED Certification of the Administration and Operations Gallery of the Dempsey E. Benton Water Treatment Plant	Long Range Water Resources Plan for Towns of Cary, Apex, Morrisville and RTP South
	<i>Erik Rosenfeldt Hazen and Sawyer</i>	<i>Kimberly Mathis Ovivo</i>	<i>Kurtis Proffitt Black & Veatch</i>	<i>Rachelle Rhodes Malcom Pirnie/Arcadis</i>	<i>Sydney Miller Town of Cary</i>
4:05 pm - 4:35 pm	Water System Optimization to Comply with Stage 2 DBP Rule	The Use of an Appropriate Bioassay for Basic Wastewater Disinfection	A Comprehensive Framework for the Combined Prioritization of Rehabilitation and Capacity Improvement Projects	Demonstrating WERF's CHEA-pet: A new powerful energy and greenhouse gas tool for WWTPs	City of Raleigh Water Conservation and Efficiency Potential Analysis
	<i>Kevin Laptos Black & Veatch</i>	<i>Josey Chan, ITT Water & Wastewater USA, Inc</i>	<i>Anna West, P.E. CDM</i>	<i>Tom Johnson CH2M Hill</i>	<i>H. Thomas Tant Hazen & Sawyer</i>
4:40 pm - 5:10 pm	Innovative Approach for Evaluating Stage 2 DBP Rule Compliance Strategies	Aerated-Anoxic Oxidation Ditch Results In Enhanced Nutrient Removal And Energy Efficiency In The Chesapeake Watershed	Considerations for Structural Design and Installation of Flexible Pipes for Sewer Applications	Harnessing Solar Energy for Biosolids Management: A Green Approach to Drying	Making the Case for your Capital Program and Operating Budgets
	<i>David S. Briley Hazen and Sawyer</i>	<i>James Steffen Siemens Industry</i>	<i>Kent Lackey, PE Black & Veatch</i>	<i>Michael Hill Parkson</i>	<i>Adam Sharpe CH2M Hill</i>

Tuesday, November 15, 2011				
TIME	WATER	WASTEWATER	COLLECTION & DISTRIBUTION	SPECIAL TOPICS
8:00 am - 8:30 am	Water Resource Issues How Does North Carolina Compare With Two Neighboring States	Process Optimization Provides Dramatic Improvements in Sustainable Nutrient Removal at the OWASA Mason Farm WWTP	Having Faith in Sewer Metering Accuracy	Revitalizing Downtown Infrastructure—Integrating Sewer Rehabilitation with Streetscape Improvements in Wilmington, NC
	<i>John W. McLaughlin, P.E. Jacobs Engineering Group</i>	<i>Vishnu Gangadharan, PE OWASA</i>	<i>Michael Koser, PE Withers & Ravenel</i>	<i>Christine Nesbit, P.E. CDM</i>
8:35 am - 9:05 am	Successful Commissioning of 800 Well Sites: Not Your Typical “Cut and Paste”	WAS Pretreatment for Enhanced Volatile Solids Reduction and Biogas Production in Anaerobic Digestion – A Process Review	Concord’s Sewer Easement Location, Notification and Education Program	ReVenture Park, Charlotte: Green Solutions for Nutrients, Reuse, and Biosolids
	<i>Dan Barnes, CDM</i>	<i>Hunter Long, Hazen and Sawyer</i>	<i>Gary Fritz, City of Concord</i>	<i>Chris Neaville, Withers & Ravenel</i>
9:10 am - 9:40 am	Multi-Dimensional Solutions for Controlling Algae in Swann WTP Raw Water Reservoirs	Nitrification and Activated Sludge Foaming - Relationships and Control Strategies	Successful Projects Demonstrate the Benefits of Surge Model Calibration	Delivering the World’s Largest Pumping Station
	<i>Bill Brewer Winston-Salem</i>	<i>Darrell DeWitt Charlotte-Mecklenburg Utilities</i>	<i>Crystal M Broadbent, PE Hazen and Sawyer</i>	<i>Dennis Kachmarsky Malcolm Pirnie / Arcadis</i>
10:15 am - 10:45 am	Lessons Learned from Joint Drinking Water Exercises between DoD and Civilian Entities	Process and Economic Benefits of Side-stream Treatment	Greenville Water System – Table Rock 42” Raw Water Transmission Main Project	Are you sure about your contractor’s surety?
	<i>Patricia Chandley, PE URS</i>	<i>Katya Bilyk Hazen and Sawyer</i>	<i>Gary Freeman Malcom Pirnie / Arcadis</i>	<i>Steve Hilderhoff GHD Consulting Engineers</i>
10:50 am - 11:20 am	Continual Monitoring of Source Water and Practical Security Monitoring	The Challenges Of ENR Treatment With High Peak Flows And Dilute, Low Temperature Wastewater	Development of a Condition Assessment Protocol to Support Asset Management Plan for the Water Distribution System of the Washington Suburban Sanitary Commission	How to Manage Contract Delivery Methods in Today’s Construction Marketplace
	<i>Katy Craig Hach Company</i>	<i>Nicholas G. Hatala, P.E. GHD Consulting</i>	<i>Gage Muckleroy GHD Consulting</i>	<i>Stanley O’Neal Gresham III, P.E. URS</i>
11:25 am - 11:55 am	Pain + Pitfalls = Progress: Expanding the Sweeney WTP	How Low Can You Go? Operational Strategies to Minimize the Dissolved Oxygen Requirements and Aeration Costs of IFAS Systems		
	<i>Brad Jones, CFPUA</i>	<i>Jason Beck, PE, CDM</i>		
12:00 pm - 12:30 pm	Preparing for the Next Frontier - Distribution System Optimization Plans	Implementation of the first Cannibal® sludge reduction process in North Carolina		
	<i>Julie Hellman, PE, HDR</i>	<i>Keith R. Garbrick, PE, Pease Engineering</i>		
12:35pm - 1:05 pm	A comparison of filtration methods for Iron and Manganese (Fe/Mn) removal in small ground water systems	Next Generation™ External Membrane Technology – Energy Advantages Using Air Lift MBR Processes	Involuntary annexation and vacuum sewers - A Case Study	Water Source Protection through BMP Implementation
	<i>Scott Smart, PE Aqua Carolinas</i>	<i>Michael Sparks Bioprocess H2O</i>	<i>Steve Hilderhoff GHD Consulting Engineers</i>	<i>Katheryn Benson CH2M Hill</i>
1:10 pm - 1:40 pm	SCADA – Mining Value Beyond Process Control	A New Biosolids Management Option for the Piedmont - A Financial Evaluation	Crossing the Atlantic Intracoastal Waterway: 4,200 LF Force Main by Horizontal Directional Drill	A Web-Enabled Tool for Predicting Perchlorate, Chlorate, and Bromate Formation in Bulk Hypochlorite Solutions
	<i>Rickey Langley Greenville Utilities Commission</i>	<i>Thomas Hahn CH2M Hill</i>	<i>Ben R. Latino, Jr., PE URS Corporation</i>	<i>Kate Keenan Hazen and Sawyer</i>
1:45 pm - 2:15 pm	Practical Security Monitoring	Meeting Chesapeake Bay 2011 Nutrient Requirements with Deep Bed Denitrification Filters	Challenges from A to Z—The Rear View Mirror for One of North Carolina’s Largest Sewers	Nutrient Management Development Trends – How does North Carolina compare to other Regions across the U.S.?
	<i>Chris Korbe, Hach Company</i>	<i>Scott Phipps, Malcolm Pirnie/Arcadis</i>	<i>Abhishek B. Yadav, P.E., CMD</i>	<i>Erika L. Bailey, HDR</i>
2:45 pm - 3:15 pm	Initial Results Show Exceptional Performance for Region’s First Jet Mixing and Four Stage Flocculation Water Treatment Plant	Back to Life: Charting a Course to Resurrect a Failing Wastewater Plant	Upstream Water Diversions Not Always Bad for Downstream Users	Addressing Sanitary Sewer Overflows at Multi-family Properties
	<i>Matthew Shoesmith, P.E. Jacobs</i>	<i>Bob Wimmer Black & Veatch</i>	<i>Reed Palmer Hazen and Sawyer</i>	<i>Bill Gintert Charlotte-Mecklenburg Utilities</i>
TIME	WATER	WASTEWATER	POLICY & MANAGEMENT	SPECIAL TOPICS
3:20 pm - 3:40 pm	Review of New Lead Standards for Drinking Water Products	Unique Treatment Technologies for Enhanced Nutrient Removal at the Land Locked Cox Creek WRF	A Look at the 2007 – 2009 Drought in the Catawba-Waterree Basin and the Successful Coordinated Response by its Regional water Supply Leaders	Using What You Have, Before You Have It: Temporary Configurations of Online Analyzers to Optimize BNR
	<i>Jeremy Brown, NSF International</i>	<i>Sara L. Allen, GHD Consulting</i>	<i>Michael Benchich, P.E., HDR</i>	<i>Chris White, PE, Hazen and Sawyer</i>
3:45 pm - 4:15 pm	Water Treatment Plant Optimization – What can it do for you	Biological Odor Control Systems: A Review of Current and Emerging Technologies and their Applicability	Using EUM to Develop Your Utility’s Strategic Plan	What You Don’t Know CAN Hurt You – Arc Flash in Water and Wastewater Utilities
	<i>Mary Darr, P.E. Orange Water and Sewer Authority</i>	<i>Brian Thorsvold HDR</i>	<i>Gerald Wexelbaum Strategy Support Associates</i>	<i>Jay Watters Malcolm Pirnie / Arcadis</i>
4:20 pm - 4:50 pm	Optimize Climate-Controlled Sodium Hypochlorite Storage for Cost Savings and Improved Sustainability	Facilitating a Multi-Lateral Solution to Water Quality Impairments of the Savannah Harbor	Cape Fear Public Utility Authority Efficiency & Competitiveness – Using Effective Utility Management (EUM) as a Benchmark	City of Lancaster Wastewater Treatment Plant Effluent Pump Station Energy Efficiency Project
	<i>Ryan Kingsbury CDM</i>	<i>Clifton F. Bell, PE, PG Malcolm Pirnie/Arcadis</i>	<i>Bradley Jurkovic Woolpert, Inc.</i>	<i>Bob Froneberger, PE, BCEE WK Dickson</i>

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TAKING UP THE Operations Challenge

Charlotte-Mecklenburg's Grease Lightning is gearing up for WEFTEC's National Operations Challenge, after winning the overall competition at NC AWWA-WEA's annual conference last November. The four members of the team and their coach are meeting regularly to practice the speed and proficiency they will need to live up to their name. Unlike North Carolina's state-level Challenge, which only encompasses events assessing proficiency in Pump Maintenance and Collection, the national competition also tests skill and knowledge in the areas of process control, laboratory and safety.

This translates into an opportunity for training in all five areas (see description in sidebar), while allowing operators to network with their colleagues from across the country. Since 1987, when a group of individuals from various areas approached WEF about adding this hands-on component to the annual conference, all states have the opportunity to compete at a national level. But even before that, several states were already running their own local version.

Indiana, for instance, opened the Wastewater Operator Olympic (later changed to Operators Competition due to legal issues with the name "Olympics") with a toga-clad "torch bearer" lighting a digester gas flare at the host plant. And when the first

national competition was held in Dallas in 1988, it was not togas that caused a stir, but gloves. The organizing committee's decision that latex trumped leather sent team members scurrying around town for supplies. Over the years, other issues were resolved, from the nature of the stopwatches to the type of pipe used in the collection event. (PVC eventually prevailed.)

The competition has been held across the country, from Chicago to Orlando and Atlanta to San Francisco, where the event was disrupted by an earthquake in 1989. By 1993, as participation grew far beyond the 22 teams that enrolled in the first year, it became necessary to divide the competition into two divisions.

Ten years later, teams were not only coming from across the border in Canada, but also from Argentina. It was also in 2003 that North Carolina first became interested in having teams of operators vying for bragging rights to the invaluable work they perform every day.

Retired Maintenance Manager Bob Norris recalls that, in the 1990s, the NC AWWA-WEA annual conference included a pipe tapping event for those involved in the water side of the industry. "The wastewater side also wanted to get involved," says Norris, adding that, at that point, there were no plans for competing at the national level. "We had to start somewhere. So we started a collection event."

The group encouraged operations and maintenance personnel to put together a couple of teams. For four or five years, the teams from Charlotte then competed against one another at the 'state' level. "We gradually started to recruit other municipalities," notes Roy Purgason, retired manager of the Sugar Creek Wastewater Treatment Plant and a member of the group.

Then in 2004, Superintendent Jackie Jarrell attended the WEFTEC conference in New Orleans. Recalls Norris: "From there, she called me and said 'you need to see this Operations Challenge. It is really interesting!'"

In 2005, Norris went to Washington to see the national event first-hand. Impressed by the scope, he returned to North Carolina to convince his colleagues that it was time to compete at the national level—in all five events. Purgason and his colleagues formed the Sludge Cats and started practicing for the national Challenge of 2006. To qualify, it was not a question of winning the state competition. Charlotte's team was the only one with the financial means to attend the national event.

Norris was judging the Collection and Laboratory events at WEFTEC's Operations Challenge that year. At the same time, he was assisting the North Carolina team in preparing for the competition by helping with the purchase of equipment they needed



to compete in each event. For three years, Charlotte's team continued to be the only one financially capable of competing at the national level. "Eventually other teams started wanting to do the same," says Norris.

In 2010, the NC AWWA-WEA added a Maintenance event to the state competition. The Operation Challenge Committee plans to continue with the Maintenance and Collection Pipe Repair events while adding a Laboratory event to the 2011 state challenge.

"If we are going to compete at the national level, we need to have every event in our state level competition," Purgason points out. "But we don't have the facilities and resources to add all five at one time, so we are doing it gradually." He notes that the committee has plans to add the Process Control event in 2012 and the Safety event in 2013.

Presently the NC AWWA-WEA is looking for sponsorship and donated equipment, approaching manufacturers for assistance with supplies and support. Because the national conference is in October and the state conference is in November, last year's winners of the state conference will be representing North Carolina at the national 2011 Operations Challenge in Los Angeles.

The winning Grease Lightning was one of five teams, which competed at the state level last year. There was one other team from Charlotte-Mecklenburg Utilities as well as two teams from Union

County and one from Asheville.

"We're one of the few states that holds its conference after the national conference," acknowledges Norris. This means that the team that wins first place at the NC AWWA-WEA's 2011 Operations Challenge in Concord this November will have the opportunity to represent North Carolina at the national competition in 2012.

Norris and Purgason both admit it can be a challenge to keep the momentum going with such a long lead-up to the national event. But the four members of the Grease Lightning are ready for action.

In both the national and state competitions teams can compete with a minimum of two and a maximum of four members plus a coach and an alternate. (The coach can also be either a team member or an alternate.) At the national level, once the challenge has started, the alternate cannot be used.

All team members participate in every event. "Typically, everybody learns a specific portion of each event," explains Purgason. "Because the events are timed, there is a certain choreography involved to reduce the distance traveled to do something. So you are going to put people in the optimum position to use their strongest skills."

He notes that cross-training is possible and is certainly essential for the alternate. On the other hand, Grease Lightning has a separate coach but no alternate. If they lose one team member, the others will have to pick up the slack.

Because each state can field as many

teams as it has WEF representatives, North Carolina could technically have two. Both Purgason and Norris agree this is unlikely to happen in the near future. Instead, the NC AWWA-WEA is throwing its energy into helping the one team they do send get into the top ten.

Although a team from North Carolina has never won the national Operations Challenge, in 2007, the Weirwolves claimed top prize for the most creative team, judged by a photograph taken of the four team members in outlandish uniforms. "Having fun with different groups is all part of the competition," says Purgason, noting that the camaraderie also encourages sharing of information. "It allows operators to see that there is more to water and wastewater operations than what they see in North Carolina." The competition provides operators with educational opportunities through technical training and increased knowledge of the industry.

"There are a lot of us out there who are really good at what we do," adds Purgason. "And we don't get much of a chance to show that to our colleagues." The Operations Challenge gives operators the opportunity to share different ways to address issues they all experience.


The competition also fosters leadership skills in its participants. "To compete in the Operations Challenge, you have to have one person take charge during every event," notes Norris. Development is gradual thanks to weekly practices which increase to two to



three times a week as the competition approaches. During the year, the team also has the opportunity to participate in challenges in other states such as Virginia, South Carolina, and New Jersey. The latter usually has 25 to 30 teams, comparable to the 44 teams that participated at the national level last year.

The state competitions use a version of the national challenge's complex scoring system which North Carolina is also looking to adapt and adopt in the near future. The system combines both time and errors for a final score. (Purgason tells the story of a female Weirwolves competitor who received a 30 second penalty for manhandling a dummy during a safety event, despite the fact that the dummy weighed more than she did!)

"We got into this just wanting to compete," says Norris. "We didn't have a structured organization. We now have an Operations Challenge Committee that can go to our NC-AWWA-WEA Director and tell her exactly what we need to move forward." The committee is hoping that, one day, the state-level Operations Challenge might even become a stand-alone event that doesn't compete for attention with conference participants trying to get their credit hours. Overall, the goal is to get an increasing number of people to participate in the challenge.

"It's going to take quite a while to get there," he acknowledges. "But that's our objective." 

**With information from "20 Years of Operations Challenge: 1988-2007", distributed by WEF at the Chicago WEFTEC Operations Challenge in 2008.*

Operations Challenge on the North Carolina level currently consists of two events, the Collections Event and the Maintenance Event. On the National level there are a total of five events*:

Process Control Event - Timed examination with compulsory participation by all team members. Each team is assigned to a table with an Operation Challenge committee representative who monitors time and participation. Comprehensive tests can cover any area of Wastewater Treatment. Team members require a broad understanding of wastewater process control, operations, math, lab, and other areas.

Laboratory Event - Perform all steps of an e-coli membrane filtration analysis using Hach products, following all method requirements in a septic technique as outlined in the Hach m-ColiBlue24 method and using standard methods 9222B (18th, 19th & 20th editions, sections 1, 3, 5a, 5b, 6) as a reference for the filtration method. Neatness, accuracy, technique, and coordination between all Team Members essential.

Collections Event - Broken pipe repair simulation, judged and scored on safety, speed, and proficiency. Team members must cut out the 'damaged' six inch pipe, cut a replacement piece with a four inch saddle tap, complete installation and pressure test the repair. Extensive coordination is required to ensure that only one team member is cutting on each table. During installation, bands must be installed and tightened without stripping then all tools returned

to chest. In partnership with the National Association of Sewer Services Company a short multiple-choice quiz will introduce the Pipe Assessment and Certification Program (PACP), a standard for coding pipe defects.

Maintenance Event - Simulates two mechanical failures on a mixer and pump. Team members must lock out tag out both. On mixer, mechanical seal and oil (simulated) must be replaced, and unit returned to service. Pump requires complete disassembly, replacement of seal and oil (simulated), inspection of back seal, complete reassembly, and return to service. Safety, speed, team coordination (only one hoist available), mechanical knowledge, and teamwork essential.

Safety Event - Simulation involves unconscious employee in confined space in addition to heart-attack victim at ground level. Team members must perform safety check list; attend to heart-attack victim (911, defibrillation); lock out tag out electrical equipment; erect fall protection and ventilation equipment; and harness one team member. Member is lowered into confined space to harness the "victim" (dummy); all are removed and equipment broken down and returned to designated storage area. Judged on safety, speed, and teamwork.

Events are changed and updated every 3-5 years by the National Operations Challenge committee.

**For further information access www.weftec.org and www.rm.wea.org/oc/ or call Steve Harrison at 703-684-2400 x 7715 or opschallenge@wef.org.*

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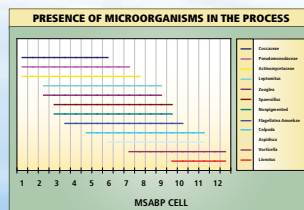
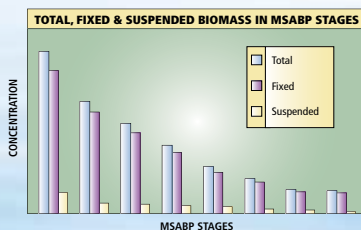
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Award WINNERS

NC AWWA-WEA members work every day to protect the public health and the environment.

The Association's awards program is designed to recognize individuals and organizations that go above and beyond expectations. In the 2011 issues of *NC Currents* we will highlight award winners from 2010.

With over 3,000 members across North Carolina it is difficult for awards committees to know about the great work of every individual and organization.

NC AWWA-WEA's award committee depends on members to step forward and nominate co-workers that deserve recognition. Award recipients have already been selected for 2011 and will be recognized at the November Annual Conference and in the 2012 issues of *NC Currents*. If you are aware of someone that fits the criteria of one or more Association awards look for the 2012 Award Nomination Packet to appear on the Awards page of www.ncsafewater.org early in 2012. The packet will include award applications, deadlines, and submission information. It is anticipated that all awards deadlines will fall before August 1, 2012.

Water For People Kenneth J. Miller Founders' Award



*Joe Mantua, Ilke McAliley
and John Kiviniemi*

The Kenneth J. Miller Founders' Award honors an individual for their outstanding service to Water For People. Ilke McAliley, a Project Engineer with HDR in Charlotte, has been deeply involved with

Water For People for four years. Born and raised in Turkey, she brings an international perspective to the issues of water and people. In the past three years she has traveled to Bolivia twice as a World Water Corps volunteer. In 2010 she took the lead in organizing the first Annual Water For People Fun Run in Charlotte, which attracted over 100 participants. Her commitment to those served by Water For People is a valuable asset for the committee and the efforts of the National Water For People organization.

2010 Recipient:

Ilke McAliley, HDR – Charlotte

Arthur Sydney Bedell Award



*John Kiviniemi, Pam
Moss and Chris Browning*

The Arthur Sidney Bedell Award acknowledges extraordinary personal service to the member association, based on organizational leadership, administrative

service, membership activity, and stimulation of technical functions or similar participation.

Pam Moss has participated in Lab Technology Day for years, served as Program Chair for the Spring Conference, volunteered on the Seminars & Workshops, Annual Conference Local Arrangements, Water For People, and Exhibit Committees, and is a past Executive Director. She is a frequent presenter of technical presentations and demonstrates her love for the profession and the Association time and again. She is recognized for her dedication to safe water in North Carolina for more than 30 years.

2010 Recipient:

Pam Moss, Hach Company

Chairs' Outstanding Service Award



Brent Reuss and Jackie Jarrell

Each year the out-going Chair of the Board of Trustees has the opportunity to give special recognition to an individual they believe has demonstrated outstanding service. Chair Brent

Reuss honored Jackie Jarrell for taking on the Sustainable Organization Task Force, and providing outstanding leadership to the group. Under Jackie's leadership, the group made a number of recommendations that were adopted by the NC AWWA-WEA Board of Trustees to ensure a strong, sustainable future for our organization.

2010 Recipient:

Jackie Jarrell,
Charlotte-Mecklenburg Utilities

Donald E. Francisco Educator of the Year Award



Bob Berndt

The Donald E. Francisco Educator of the Year Award is given annually to a member who demonstrates outstanding service to the Association and water and wastewater industry through

the education and training of water and wastewater professionals.

Bob Berndt is a passionate teacher and leader in the industry. As an educational organization, NC AWWA-WEA's mission is to expand the knowledge, skills and abilities of those who work in the water and wastewater industry and Bob represents the finest in this tradition.

2010 Recipient:

Bob Berndt,
Hazen and Sawyer - Raleigh

Hatfield Award



TJ Lynch

The William D. Hatfield award recognizes an individual for outstanding wastewater treatment plant performance and distinguished professionalism. The recipient pursues an advancement of the art and knowledge

of wastewater treatment. TJ Lynch has consistently demonstrated outstanding performance and professionalism to the City of Raleigh and to NC AWWA-WEA, serving as the Wastewater Operators representative on the Board of Trustees for the past two years and now chairing the Professional Wastewater Operators Committee.

2010 Recipient:

TJ Lynch, City of Raleigh

Select Society of Sanitary Sludge Shovelers (5-S)



Mark Wessel, Bill Brewer, Mike Osborne and Catrice Jones

The North Carolina Select Society of Sanitary Sludge Shovelers Chapter was formed in 1986 to recognize those members who have contributed their time and energy for the betterment of their Water Environment Association.

2010 Recipients:

Mark Wessel, CDM
Bill Brewer,
City of Winston-Salem
Mike Osborne, McKim & Creed
Catrice Jones,
NC AWWA-WEA

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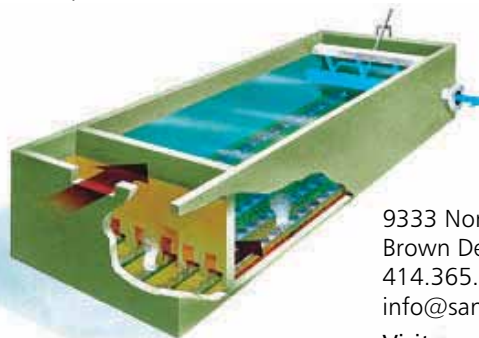
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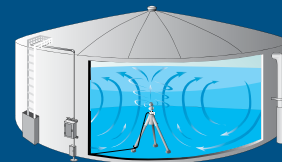


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Special
Section

EDUCATING OUR COMMUNITIES;

Effective Public Education Efforts in North Carolina

The mission of our Association, as developed in our July 2009 Strategic Plan states “*NC-AWWA-WEA is an association of volunteers dedicated to protecting public health, promoting environmental stewardship, providing professional development, and increasing public awareness of the water environment.*” It is safe to say this Mission necessitates a strong public education effort on many different levels. This issue of *NC Currents* presents the Association’s public education efforts from several perspectives. There is not enough print space to capture everything we do from our Communication and Government Affairs Committees to Conference Planning and Young Professionals, and everything in between, but the following pages provide a snapshot of some of our most popular and successful programs implemented by our membership.

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Public Education and the NC AWWA-WEA

George Simon, MWH Americas; Al Nelson, City of Durham; LaVelle Donnell, City of Greensboro

While the entire Association shares the responsibility of spreading a message of awareness of our water environment, the Public Education Committee (PEC) is specifically tasked with identifying opportunities, and providing the resources to educate the citizens of North Carolina about water resources and the water environment. Presented below is an overview of some of the many initiatives of the PEC that take NC AWWA-WEA's important message out of the industry and into a public forum.

Students and Science Fairs

About five years ago, the PEC made a commitment to enhance outreach to students – from elementary school through high school. One method to achieve this is to actively engage students and highlight the importance of the water industry by reaching out through regional and state science fairs. Cash prizes and certificates of excellence are awarded in the water field to students with outstanding water-related projects. Over the years, the number of water themed science fair projects continues an upward trend in North Carolina Science Fairs, as the students and fair organizers continue to anticipate participation. This has resulted in new record highs across the board. In 2011, PEC volunteers attended 8 of the 10 regional science fairs (a new record, up from 7 last year) as well as the State competition. At the regional level 16 elementary projects (up from 10 last year), 13 middle school projects (up from 9 last year) and 16 high school projects (up from 14 last year). This success is attributed to great volunteers from not just the PEC, but also other NC-AWWA-WEA committees such as the Young Professionals Committee. Many thanks to the fair volunteers!



The Best of the Best – The Stockholm Junior Water Prize

Since it began in 1997, the Stockholm Junior Water Prize (SJWP) has become

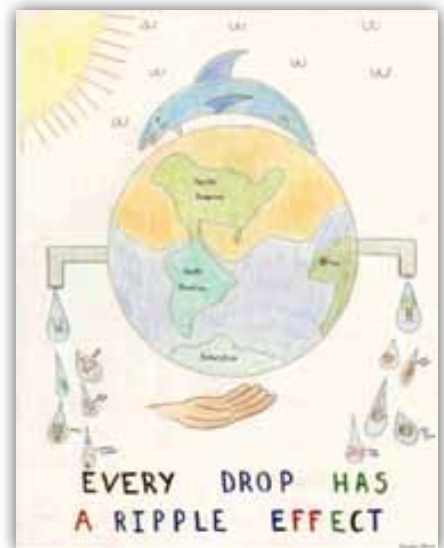
one of the most esteemed prizes for high school water-related science projects at both the national and international level. One of the mottos of the SJWP is 'Inspiring Today's Students and Improving Tomorrow's Water.' The SJWP rewards students for the contributions they are making to research in the field of water, and encourages them to continue on this path. It also rewards teachers and their schools, those who support the students, by rewarding both with trips to the National Competition, publication opportunities, and cash prizes.

NC AWWA-WEA has made great strides to identify and encouraging students to develop projects suitable for the national competition. In fact the 2009 North Carolina representative, Eileen Jang, won the U.S. National Competition and earned a trip to the international competition in Stockholm, Sweden. And this year in 2011, NC winner, Jenifer Brown, placed as the Runner-up at the National Competition! With our engine now fine-tuned at identifying projects and encouraging submittals, the PEC is turning its attention to possibly hosting an upcoming National Competition here in North Carolina. If successful, this will be an excellent opportunity to highlight our Association and bring some of the brightest students in the country to showcase all that North Carolina has to offer, such as rich environmental ecosystems, top-notch educational universities and colleges and much more. Making this happen in the state will require a great deal of planning and volunteer support is critical to its success. Recently, a task force was created to evaluate hosting a future competition. This is an exciting opportunity to get involved in

the education of future water professionals, and also work closely with our parent organization, WEF. If you are interested in volunteering or learning more, please contact Mr. Robert Pearson, Task Force Leader, at pearsonr@usi-eng.com. For more information on the SJWP, visit <http://www.wef.org/sjwp/>.

Poster Contests

Each year the NC AWWA-WEA Public Education Committee sponsors a state poster contest centered on a water conservation/quality theme. Students in grades K – 8 are eligible to participate in the contest. The contest is separated into three grade divisions: K – 2, 3 – 5, and 6 – 8. Students learn many valuable lessons about the importance of keeping water sources clean and conserving this precious resource. All utilities in the state are encouraged to promote the contest in their local schools (public and private) and seek participation from home schoolers as well. The cities of Durham and Greensboro have the longest tenure in contest sponsorship at the local level. Using the poster contest theme agreed



Shaylen Atma; 1st Place; Grades 6-8

upon by the PEC members, these utilities promote the contest widely, participating in Science Days and other community events and conducting numerous presentations to inform their future water customers about this important natural resource. Local winners are acknowledged in their respective cities via prizes and often recognized at City Council or County Commissioner meetings. Winners from each city are then judged by PEC members for the NC AWWA-WEA state level competition. Entries selected by the PEC members receive a certificate and prize money for the 1st through 3rd place winners in each division.

Delivering the Message

The PEC has made great strides educating and communicating with a younger, student audience over the past few years. Efforts and attention continue to focus on reaching a broader audience including elected officials and the general public. Technology, specifically the internet and now social media, are proven tools that have enhanced communication and public education world-wide. However, with the sheer magnitude and speed at which this information is now delivered, the public can easily get overwhelmed with information overload. The challenge that organizations such as ours face is not only delivering the most concise and relevant information, but also providing those messages via the most effective delivery mechanism. A recent update to our Association website (www.ncsafewater.org) presents a more streamlined and user-friendly approach to accessing information.

Public education is an ongoing task that requires bright minds and motivated individuals to help effectively deliver our Associations' goals and vision of being an authority on water related issues throughout North Carolina. How do we craft the right public education messages? How do we effectively leverage delivery mechanisms such as Facebook, MySpace, Twitter, Webpages and Email? Our Association is seeking volunteers interested in helping define these messages and delivery

mechanisms that will ultimately enhance public education about water related issues throughout our State. Please reach out to the Public Education Committee (George Simon, at George.simon@mwhglobal.com) if you are interested in volunteering.

George Simon, *Project Manager*, MWH Americas, Charlotte, Public Education Committee Chair; **Al Nelson**, *Conservation Coordinator*, Division of Regulatory Compliance, *Department of Water Management* - City of Durham; **LaVelle Donnell**, Public Education Coordinator, Department of Water Resources, City of Greensboro.

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Jim Miller, Central NC
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Barry Harms, Western NC
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NC AWWA-WEA Student Chapters

Mary Knosby, HDR

The Students & Young Professionals Committee is proud to announce the formation of two Student Chapters! UNC-Charlotte (UNCC) officially formed a Chapter in October 2010 and NC State University (NCSU) in May 2011.

Our committee has been engaged with these universities for many years and officially started a program for students at our Annual Conference in 2002. Benefits for students include reduced price and limited free registrations, Association member conference guides, a student lunch and a networking social. Students are also encouraged to participate and be in attendance for the annual poster contest. We have hosted many lunch-n-learn technical presentations on campuses over the years and urged the students to 'make it official' and create a student chapter to maximize

the benefits our Association has to offer, as well as national AWWA and WEF.

Activities to date for UNCC include two meetings per month, with one meeting including a technical speaker. Professionals are always invited and have been integral in providing contacts and scheduling activities. During National Engineers Week, UNCC planned a social night at Buffalo Wild Wing, a shadow day for high school students, a movie night for engineering students on campus, and a chapter meeting with guest speaker. In April, NC AWWA-WEA professionals hosted 15 students and 1 faculty member at Icehouse Southend for an end-of-the semester celebration. The dinner was well attended and provided a great networking opportunity!

The NC State Student Chapter hit the ground running as soon as their officers

were elected! They held 2 meetings prior to the end of the semester to set up future meetings and survey the membership to help plan events and speakers. They created a Facebook page, participated in Adopt-a-Stream with the Students & Young Professionals Committee at the Walnut Creek Wetland Center on April 17, held an end of semester social at Porters on May 2, and also toured the Lake Johnson Dam on June 21. Two of their officers, President Leigh-Ann Dudley and Treasurer Kitty Hiortdahl, attended the Board-Chair Workshop held on May 19 in Huntersville. This chapter has many great ideas and expects a very active fall semester!

Chartering the student chapters at UNCC and NC State is very exciting for our Association! We have always enjoyed networking with and including the students - and now they are officially part of NC AWWA-WEA!



NCSU students touring Lake Johnson dam.



NCSU Student Chapter social.



Student lunch at 2009 Annual Conference.



Student Poster Contest at 2009 Annual Conference.



Student Poster Contest at 2009 Annual Conference.



UNCC accepting student chapter charter from Brent Reuss (right) at the 2010 Annual Conference.





NCSU Student Chapter Members

- | | |
|-----------------------------|--------------------------------|
| Leigh-Ann Dudley, President | Angela Mastropole |
| Yuxuan Wan, Vice-President | Susan Dunn |
| Yi Wang, Secretary | Bilgen Yuncu |
| Kitty Hjordahl, Treasurer | Mahbuba Iasmin |
| Evan Ged | Bahareh Karami |
| Ryan Blair | Mehrnoosh Eslaminia |
| Hellen Taylor | Justin Pescosolido |
| Chandler Warner | Eltana Velvet Gason |
| Chris Mattox | Katie Dorety |
| Kristin Caracappa | Rachel Ingham |
| Lele Bao | Danielle Touma |
| Xiaoming Wang | Jared Hostetler |
| James Hennessy | Benjamin Lord |
| Caroline Bennighof | Eliana Velvet Gaston |
| Marc Mueller | Nate Myers |
| Guangfu Zheng | Ling Wang |
| Lauren Handsel | Xia He |
| Lauren Olney | Siddherth Savadatti |
| Behdad Yazdani | Kevin Hunter |
| Ruth Small | John Robinson |
| Meredith Fotta | Hemant Patel |
| Mohammad Shamsul Arafin | Andrew McNaman |
| Harminder Singh | Detlaf Knappe, Faculty liaison |
| Rush Combs | |



UNCC Student Chapter Members

- William Boivin, President
- Amir Alansari, Vice-President
- Javier Solis, Secretary
- Matthew Gaston, Treasurer
- Olufemi Aborisade
- Forrest Alexander
- Brooke Bowden
- Andrew Cheek
- Tracy Chouinard
- Darion Colbert
- Trent Elder
- Jonathan Goodman
- Tyler Howell
- Brent Hyatt
- Jacob Lowe
- Ping Lu
- Paa Kwesi Prah-Ennin
- Nathalia Queen
- Will Shull
- Ryan Whitmore
- Sean Windt
- David Yarbrough
- James Amburgey, Faculty liaison

Mary Knosby, PE is the Water Business Group Manager for HDR located in their Charlotte, NC office. She has been involved with student activities for more than 10 years and facilitated the creation of the new Student Chapters.



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Customer Guides to Understanding Rates & Your Utility Bill:

Charlotte Mecklenburg Utilities New Approach to Budget Communication

Karen Whichard and Craig Harmon, City of Charlotte



Customer's Guide to Understanding Rates and Your Bill

Since its creation in 1972, Charlotte-Mecklenburg Utilities has made strategic infrastructure investments. These investments have served our growing community's needs while protecting public health, supplying high-quality drinking water, ensuring fire protection, and supporting the economic vitality of Charlotte and Mecklenburg County.

Building and maintaining this system to the safest standards requires key capital investments that, in turn, drive the overall budget for the department.

Utilities is funded solely from the rates and fees charged for water and sewer.

Beginning July 1, customers will see changes to their bill reflecting a new rate structure and rate increase. It's important to understand the reasons behind these changes and that's why we've prepared a **Customer's Guide to Understanding Rates and Your Bill**.

Information presented is as of May 9, 2011

When it comes to communications and public relations, it is very easy to slip into the traditional routine of prioritizing audiences by the size of their microphone.

As the U.S. continues the rapid pace of communications fragmentation – driven in part by the social media explosion, the rise of internet search and the decline of traditional media outlets – a more strategic approach related to cultivating key influencers typically provides a greater return on your communications investment.

For the Charlotte-Mecklenburg Utility Department (CMUD), this meant reevaluating and tweaking its approach to budget communications for FY2012.

First and foremost, the utility brought new emphasis to arming stakeholders with relevant information needed to easily convey the very complex nature of CMUD's budget, rate structure and operational needs.

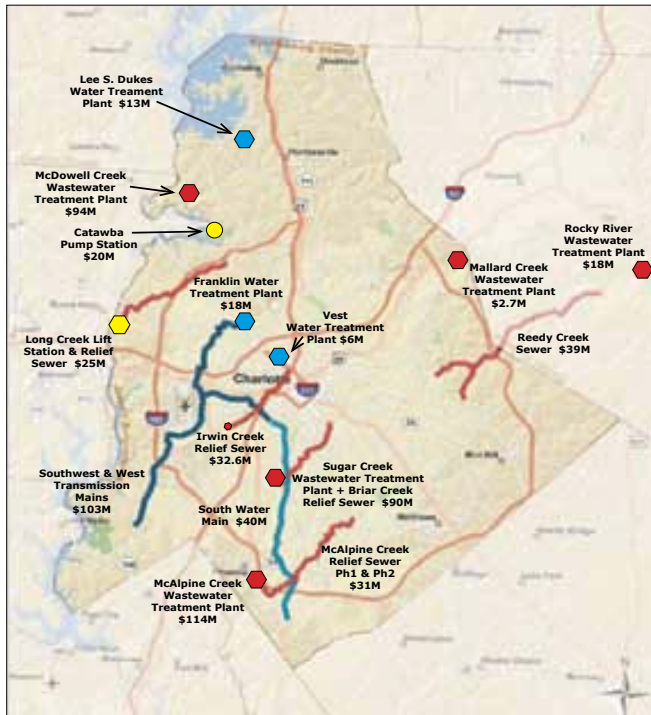
The *Customer's Guide to Understanding Rates and Your Bill* was born from this approach. The four-page *Guide* uses graphics and high level messages to holistically re-introduce the utility to its customers. It outlines significant capital investments, addresses concerns over extended time periods for leak repairs, and explains the impact of a new rate structure and proposed rate increase for customers.

By bundling topics and limiting internally important but externally less relevant details of the rate methodology changes and proposed rate increase, the *Guide* helped CMUD and its City leadership communicate more effectively to the public and key influencers about the very real needs, challenges and goals of the water & sewer utility.

Used extensively by Charlotte City Council members in their interactions with constituents, the *Guide* was also provided to other key stakeholders including leadership with the six other Mecklenburg County towns served by CMUD. It was also inserted into a group of weekly news publications that reach a significant portion of the service area, posted online and sent out via the City of Charlotte's social media feeds.

Capital Improvement Projects and Investments

This map represents some of the water and sewer projects completed since 2000 to serve the needs of our community.



Water and Sewer Improvements

Briar Creek Relief Sewer +	
Sugar Creek Treatment Plant Upgrades	\$90 million
Catawba Pump Station Expansion	\$20 million
Franklin Water Treatment Plant Expansion	\$18 million
Irwin Creek Relief Sewer	\$32.6 million
Lee S. Dukes Water Treatment Plant Improvements.....	\$13 million
Long Creek Lift Station and Relief Sewer	\$25 million
Mallard Creek Wastewater Treatment Plant Improvements....	\$2.7 million
McAlpine Creek Relief Sewer, Phase I and II	\$31 million
McAlpine Creek Wastewater Treatment Plant Improvements..	\$114 million
McDowell Creek Wastewater Treatment Plant Expansion.....	\$94 million
New Reedy Creek Sewer Line	\$39 million
New Rocky River Wastewater Treatment Plant.....	\$18 million
New South Water Main.....	\$40 million
New Southwest Water Main	\$84 million
Vest Water Treatment Plant Improvements.....	\$6 million
New West Water Main	\$19 million

Rehabilitation

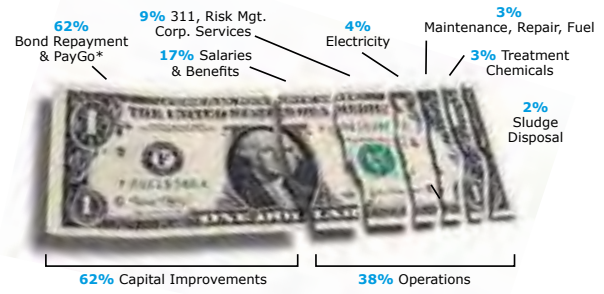
More than \$100 million invested in restoring and maintaining aging water and sewer lines.

Fire Protection

Utilities provides water for fire protection throughout Mecklenburg County and is responsible for repairing 16,000 hydrants and valves.

Cost of Improvements and Investments

Paying for capital and infrastructure projects accounts for 62 cents of every dollar spent by the utility, and is in many ways like a mortgage that has to be paid back over time. Utilities works hard to maintain a AAA-credit rating. This allows the utility to build new projects at the lowest possible borrowing rate and save millions in interest costs.

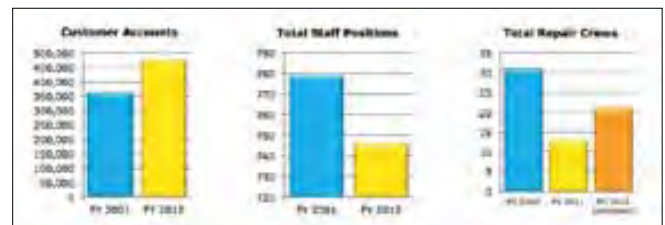


*PayGo (Pay-As-You-Go) cash used for capital projects

Operating Efficiently

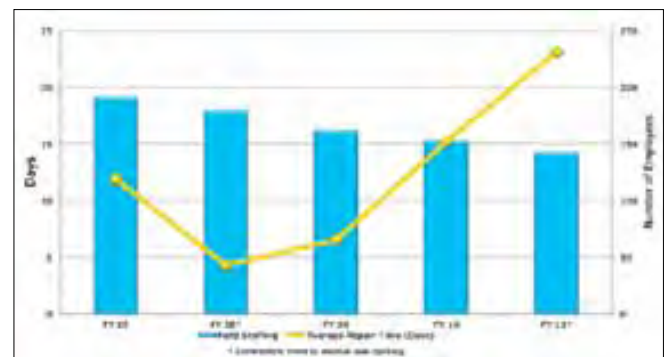
In an effort to maintain lower costs for customers, Utilities has increased its efficiencies in areas like energy management and reduced staffing levels. Utilities has fewer positions today than in 2001.

Water and Sewer Customer Accounts and Staff Positions



The proposed rate increase will put crews back into the field to address water leak backlogs and other maintenance items. Currently, there are 13 pipe repair crews, down from 31. The rate increase will restore 8 additional crews. This would help reduce the service backlog by adding capacity to fix about 16 additional leaks each day on average.

Minor Leak Average Repair Time (Days)



New Rates

Effective July 1, the proposed rate increase will impact each customer differently based on their water usage. For most residential customers, the impact of the new rate structure and tier rates will lead to an increase from between \$.37 to \$8.99 per month, with most seeing increases between \$4 and \$4.59 per month.



Utilities is a 24/7 operation. Maintenance and construction crews repair an average of 2 leaks per crew per day.

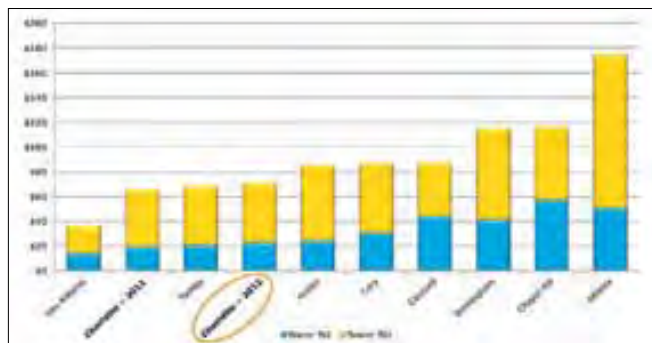
For the typical customer who uses 8 Ccf of water each month, the total monthly bill increase will be \$4.59. Of this \$4.59, \$2.85 will pay back construction loans. The remaining \$1.74 pays for increases for personnel, chemicals, maintenance and 311/customer service.

A very small percentage of customers will see their total bill decrease because of the reduction in the sewer cap.

Water and Sewer Rates 2011-2012

	2011 (current)	2012 (proposed)
Tier 1 (1-4 Ccf)	\$1.45	\$.98
Tier 2 (5-8 Ccf)	\$1.64	\$1.96
Tier 3 (9-16 Ccf)	\$2.69	\$3.41
Tier 4 (over 16 Ccf)	\$5.32	\$5.32
Sewer Charges	\$4.31	\$4.14

10 Ccf Customer Bill Comparison to Other Cities



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Your New Water and Sewer Bill

Customers will see a new fee, called an availability fee, added for water and sewer. This fee is to help reduce the utility's dependence on revenues from water consumption to pay back money borrowed to construct projects.

Throughout the last decade, extreme weather conditions disrupted Utility's revenue stream. This fee helps address that challenge.

The sewer cap will also be lowered from 24 Ccf of metered water usage to 16 Ccf. This reduction recognizes that residential customers using more than 16 Ccf generally use some water for irrigation or other outdoor purposes, and that water does not return to the sewer system for treatment. The new rate structure accounts for this.

Common Terms

Availability Fee: This new fee applies to both water and sewer. It helps Utilities pay for water and sewer projects as well as reduce the impact of consumption changes due to weather. The fee will vary based on the size of a customer's meter. A standard residential customer has a 5/8" meter and will have a fee of \$2.25/billing period for water and \$4.30/billing period for sewer.

Ccf: An abbreviation representing 100 cubic feet. This is a unit of measure which equals 748 gallons.

Fixed Fee: These charges for water and sewer stay the same each month. The fixed fees recover the cost of servicing accounts, such as the cost of meter reading and billing. The fixed fee charges are \$2.40/billing period for water and \$2.40/billing period for sewer.

Irrigation Meter: A separate meter that supplies water only to an outdoor irrigation system. Water used through an irrigation meter is not subject to sewer usage charges and is billed beginning at the Tier 3 water usage rate.

Methodology (rate structure): This is the method that Utilities uses to establish rates. The new method was approved by City Council in February 2011 and includes the availability fee, lowers the sewer cap and introduces incentives for installing irrigation meters.

Sewer Cap: A residential customer's sewer usage is not metered. The sewer charge is based on their metered water usage each month. The sewer cap is the maximum amount of water usage upon which customers are charged sewer fees. It is assumed that water use in excess of the sewer cap is used primarily for irrigation or other outdoor purposes and does not return to the sewer system. Beginning July 1, the residential sewer cap will be reduced from 24 Ccf of metered water usage to 16 Ccf.

Water Usage Rates: Vary based on the amount of water used and are divided into four tiers. Usage is measured in Ccf. Seventy-five percent of residential customers use 8 Ccf or less each month on average.

Water Usage for 13 Months

Aug Oct Dec Feb April June Aug

PREVIOUS BALANCE	\$ 65.62
PAYMENTS	65.62
NEW CHARGES	
Water Usage	11.76
Sewer Usage (\$4.14 per Ccf of water usage)	33.12
Water Fees (\$2.40 fixed and \$2.25 availability) ..	4.65
Sewer Fees (\$2.40 fixed and \$4.30 availability) ..	6.70
Storm Water Fee	9.39
TOTAL NEW CHARGES	65.62
TOTAL AMOUNT DUE	\$ 65.62

YOUR BANK ACCOUNT WILL BE DRAFTED ON 09/29/11.

Impervious Area for Storm Water: 2,397 square feet
Billing period for Storm Water: 08/08/11 - 09/08/11 = 31 Days

Our records indicate your number is
704-123-4567

If this number is not correct, please contact us at
311 (704-336-7600) or utilbill@charlottenc.gov.
Thank you.

Meter Readings:

Meter No	Previous Read	Current Read	Usage (Ccf)	Days of Service
123456789	July 27 280	Aug 27 288	8	30

Conservation Rates and Your Water Usage

<u>Usage Tiers</u>	<u>Rates / Ccf</u>	<u>Water</u>
1-4 Ccf:	\$0.98	4
5-8 Ccf:	\$1.96	4
9-16 Ccf:	\$3.41	
over 16 Ccf:	\$5.32	
Total Usage - In Ccf		8
Total Usage - In Gallons		5,984

* 7.48 gallons = 1 Ccf

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Karen Whichard

Karen is a public information officer with Charlotte-Mecklenburg Utilities. Prior to joining CMUD in March 2011, Whichard served as the Communications Director for the City of Kannapolis. She holds a degree in Journalism and Mass Communication from UNC-Chapel Hill.



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NC AWWA-WEA'S Third Annual Model Water Tower Competition

Chris Belk, Hazen & Sawyer

This year will mark the third year the NC AWWA-WEA has put on a model water tower competition in which middle school students are challenged to construct a functioning water tower that will hold at least 1 gallon of water and stand in a 12-inch square. Students can compete individually or in a team of up to 4 students. The towers are judged in five categories: hydraulic efficiency, cost efficiency, structural efficiency, design ingenuity and materials ingenuity. Thanks to the efforts of City of Raleigh employees Tim Woody and T.J. Lynch, this year's contest will be held on Saturday, November 19th, at the Neuse River Wastewater Treatment Plant in Raleigh. The competition is open to any middle school student in the state, but due to its location, competitor recruitment ef-

orts will focus in and around Wake County. Cash prizes of \$300, \$200, and \$100 are awarded to the 1st, 2nd and 3rd place finishers, respectively. Funding for this year's competition is made possible by donations of \$500 each from the Crom Corporation and Hazen and Sawyer, P.C.

The model water tower competition (MWTC) was created in 2004 by Tod Phinney, then with the AWWA Florida Section (Phinney is currently with WH Pacific in Albuquerque). It was brought to the NC Section in 2008 by Florida Section-transplant Ash Vakharkar. The Florida Section graciously donated two submersible pumps to get us started. The rest of the equipment needed to host the competition was purchased with donations from Water For People Committee members.

Recently, the NC AWWA-WEA Board moved responsibility for the MWTC from the NC Water For People Committee to the Public Education Committee. NC Water For People Committee members will continue to help staff the event and will help transition the event to the Public Education Committee. The Public Education Committee is excited about this new outreach event and is better positioned to promote the competition through its existing educational contacts.

If you have a middle school-age student who is interested in competing, please contact event organizer Chris Belk at (919) 755-8637 or email cbelk@hazenandsawyer.com, or Public Education Committee Chair George Simon at (704) 552-3886 (george.simon@mwhglobal.com).



1st place winners L to R Elijah and Sierra proudly displaying the "Z" water tower.



NCAWWA-WEA volunteers Susan Dunn and Crystal Bonge testing the capacity of the Team Hydro (Daniel Meyers and Nick Freeh) model water tower.

2nd Annual Model Water Tower Competition Contestants L to R Makaya Parham, Caleb Woody, Calik Parham, David Meyers, Logan McCollum, Joseph Meyers, Kyle Samarco, and Danial Meyers.



1st place winner Caleb Woody proudly displaying his "City of Oaks" acorn shaped water tower.



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NC Safewater Endowment Program - Investing in Future Water Professionals

Les Hall, NC AWWA-WEA Endowment Committee Chair

As I am writing this article, the Endowment Committee is embarking on the Endowment Fund Raising Initiative for 2011. We have over 30 volunteers who will be visiting potential donors between July 1 and September 30 in an effort to raise \$200,000 for the NC Safewater Endowment Program.

You may be asking "Why does NC AWWA-WEA need an endowment and who will benefit from the fund raising initiative?" The answers to this two-part question is clear to the members of the Endowment Committee who have been involved in evaluating how our Association can respond to satisfy the needs of the water industry in North Carolina. Hopefully the answers will also become clear to you as you read this article.

The Water Industry has many needs; however, the Endowment Committee has focused on two areas of major concern:

1. Enhancing education about the water environment in schools
2. Training and educational needs of future water professionals

Published data show that 40% or more of the existing work force will retire over the next ten years. Also the Bureau of Labor estimates the water industry will experience a 45% employment growth to meet the need to provide clean, clear, safe water to our communities. It will be a challenge to satisfy this large increase in work force; however, we believe that more and better education in water environment issues will instill interest in students to pursue careers in the water industry. Members of the Public Education Committee have worked with science teachers across the State for several years to provide them with additional resources to enhance education in the water environment. Unfortunately our resources have also been limited; therefore, many needs have not been satisfied. The teachers who have received grants from the Public Educa-

tion Committee have been very appreciative and have indicated that the assistance has made a difference.

Concurrent with the need to replace 40% of the existing work force and recruit additional employees to provide for growth, the water industry must also comply with more stringent regulations promulgated by State and Federal agencies for the purpose of keeping drinking water safe and protecting the quality of the water environment. Complying with these regulations will require use of advanced technologies. Future water professionals will need more training and a higher level of knowledge in complex treatment processes and operating systems in order to operate and maintain them.

Throughout its history, NC AWWA-WEA has responded to the educational needs of water professionals by developing training programs that include schools, seminars, workshops and conferences. The Association has provided educational opportunities for thousands of operators, technicians, engineers, customer service personnel and other water professionals who desired to increase their knowledge and skills. The programs also gave the attendees an opportunity to earn educational credits that are required in order for them to maintain their certifications and/or licenses. NC AWWA-WEA is recognized throughout North Carolina for the quality of its training programs.

Soon after it was formed, the Public Education Committee realized that even with the success of NC AWWA-WEA's training programs, there were unmet educational needs existing in the water industry in North Carolina. These needs included support for students who desired to further their education in the water industry by pursuing degrees from either a community college or a four-year university and environmen-

tal educators who needed support in teaching elementary through high school students about the water environment. Initially the Public Education Committee responded to these needs by awarding grants to science teachers to purchase additional teaching materials and/or pursue more training in the water environment.

About 2000, the Public Education Committee decided to expand the financial assistance program by establishing The Carol Bond Memorial Scholarship in honor of Carol Bond. Carol was a strong advocate for education about the water environment and a long time member of NC AWWA-WEA and the Public Education Committee. As part of the expanded program, the Public Education Committee established a goal of awarding two \$1,000 scholarships per year to four-year university students, four \$500 scholarships per year to community college students and two \$500 grants per year to environmental educators. This program has continued from its inception to the present.

Understanding this history will help you understand the future. The Carol Bond Memorial Scholarship has been funded on a basis of cash in/cash out. As long as the annual contributions equal or exceed the annual expenditures, the program is successful. However, if the donations are less than the expenses, the goals established cannot be met. Even though this method of funding the scholarship program has been successful, the leaders of NC AWWA-WEA realized that it had potential limitations in satisfying future needs of the water industry.

In 2008, Steve Shoaf, Chair of NC AWWA-WEA appointed an Endowment Task Force to evaluate the feasibility of developing a sustainable funding source for:

1. Increasing water environment education in schools, and
2. Expanding the Association's support of scholarships for students attending four-year universities and community colleges.





Upon completion of its evaluation, the Endowment Task Force concluded that it was feasible to establish an endowment for the purpose of promoting safe water, increasing knowledge and understanding of safe water, and preserving and enhancing the water environment. The Board of Trustees of NC AWWA-WEA approved the recommendation of the Endowment Task Force in September 2009. The board also agreed to allocate \$25,000 for the initial funding of The Safewater Fund. The Public Education Committee agreed to donate \$25,000 to establish The Carol Bond Fund. Since the initial funding of these two funds in 2009, the Safewater Endowment Program has grown to include four funds and total assets of over \$120,000 as of June, 2011.

So why does NC AWWA-WEA need an endowment program? Simply stated, the needs that exist in the two areas of focus of The Carol Bond Memorial Scholarship are greater than that concept can fund sustainably in the future. An endowment program provides the mechanism by which the funding source can grow while maintaining a sustainable source of funding in perpetuity.

The intent of the Endowment Program is to provide scholarships to students who are completing a course of study emphasizing the protection of public health by providing healthful drinking water and/or protecting the quality and integrity of the water environment. The Endowment Program will also provide grants to educators who provide enhanced water environment education to registered students and/or the public. The need for support in these areas are pronounced and very appreciated as evidenced by letters the Association has received from previous awardees of scholarships and grants from The Carol Bond Memorial Scholarship Fund. Examples of these needs and appreciation are summarized below:

Alia Kahn – Alia was awarded a scholar-

ship at the beginning of her senior year at UNC-Chapel Hill Gillings School of Global Public Health. She was paying her way through college and the scholarship helped her pay her educational expenses that year. After receiving her BSPH degree, she spent one year at the University of Oslo as a guest student at the Centre for Environment and Development. Upon returning to the United States, she entered graduate school at the University of Colorado-Boulder where she is working with Dr. Diane McKnight on Aquatic Ecology. After she receives her MS degree, she will pursue a Ph.D. She stated in her letter “I believe that the Carol Bond Scholarship positively impacted my academic and career goals and I am truly grateful for it. It is my firm belief that scholarships such as this can make a tremendous difference in a young student’s life and career trajectory.”

Ryan Faw – Ryan is a full time employee with the City of Raleigh as an Industrial Pretreatment Technician at the Neuse River Wastewater Treatment Plant. He is also pursuing an associate degree in Environmental Science at Wake Technical Community College. He stated “receiving the scholarship has helped to further ease

the financial burden of attending classes as a working adult.” He also stated “Receiving the Carol Bond Memorial Scholarship reinforces a student’s hard-work and is a great encouragement to continue that work ethic. Many students, like myself, work full-time while taking classes. This can take a toll on a student, and scholarships such as these help so much as a mental and financial boost.”

Flo Gullickson – Flo is a teacher at Southeast Guilford High School. She wrote in her letter “I would like to tell you why I feel the Carol Bond Scholarship is important to me and many others. I met Carol as a participant in an Environmental workshop that we both took in 1997. Part of the program she set up was to tour the Raleigh waste treatment and water treatment plants. I have been teaching AP Environmental since 1997-1998, the year after the workshop. Because of Carol’s tours the treatment plants have become an integral part of my program. Some years there isn’t money to take field trips and the Carol Bond Scholarship has helped me keep that field trip in my program. Carol was a wonderful influence and I feel her scholarship should continue so others can use the money to have students experience visiting wastewater



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and water treatment plants. I have many wonderful pictures of their expressions as they take the tour. I also did a study and took some students and left others behind. When they were tested the ones that went did 25% better on the test. Sometimes the senses of smell and sight are the best way to learn.”

In the future, students and teachers who have similar needs as the three previous awardees presented above will be eligible for scholarships and grants from the NC Safewater Endowment Program. As of June, 2011, the NC Safewater Endowment Program included four funds:

1. NC Safewater Fund
2. The Carol Bond Fund
3. The Raftelis Foundation Elementary Education Fund
4. The Les and Elaine Hall Water Environment Stewardship Fund

Each of these funds has a different focus as described below:

NC Safewater Fund – The primary use of the Safewater Funds is intended to support the objectives of scholarships for future industry members and environmental education. The Safewater Fund awards and grants are directed by the NC AWWA-WEA Board of Trustees and fall into the following two focus areas:

1. Safewater educational support to attract and retain industry professionals

2. Environmental education that serve to enhance overall safewater knowledge of the public

The Carol Bond Fund – The Carol Bond Fund is a more narrowly focused fund, which is channeled toward awards and grants that encourage interest in environmental education. The Carol Bond Fund awards scholarships annually to four-year university students, community college students and environmental educators.

The Raftelis Foundation Elementary Education Scholarship – George and Eva Raftelis established this fund to encourage awareness and understanding of environmental issues by promoting elementary education programs, reading and video materials and competitive awards to educators and elementary students about the value of water.

The Les and Elaine Hall Water Environment Stewardship Fund – The purpose of this fund is to provide financial assistance to students who are studying engineering, with a concentration in the Water Environment, in an ABET accredited engineering curriculum at one of the UNC campuses.

The last three funds are classified as ‘Named Funds.’ A donor can establish a ‘Named Fund’ by donating a minimum of \$25,000 and obtaining approval of the name of the fund and any restrictions the donor places on the use of the fund from the NC

AWWA-WEA Board of Trustees. As we grow the Endowment Program, we anticipate that more ‘Named Funds’ will be established. This will give donors more alternatives as they decide how they want their donations allocated.

By the time you are reading this article, the Endowment Fund Raising Initiative for 2011 will have been completed. However, the task of growing our NC Safewater Endowment Program will have just begun. Even though raising \$200,000 will enable the Endowment Program to triple the beneficial effects of our current funding program, the needs that exist are even greater. At the Annual Conference, we will kick-off an every member campaign to encourage 100% of our members to contribute to the NC Safewater Endowment Program.

It will take many more water professional to tackle the challenges faced by the water industry in the future. We must also help the public better understand the value of the water industry’s professionals and the value of safe water. Through your gifts of time and resources, we invite you to join the every member campaign and help ensure that the next generation of water industry professionals and advocates will be better educated and more talented than the outstanding professionals we have today. Our success in growing the Endowment Program will help us continue the historical leadership NC AWWA-WEA as given to the protection of a clean, clear, and safe water supply.



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Water For People and the North Carolina Water For People Committee

Chris Belk and Crystal Broadbent, Hazen & Sawyer

Throughout the world, there are communities with limited access to safe drinking water and sanitation facilities, resulting in nearly 6,000 deaths a day from water-related illnesses. Numerous organizations and local governments are working to change this condition for the 884 million who do not have access to safe drinking water and 2.6 billion without adequate sanitation facilities. One of these organizations is Water For People, which is the charity of choice for AWWA. Water For People currently works in eleven countries: Uganda, Malawi, Rwanda, India, The Dominican Republic, Guatemala, Honduras, Nicaragua, Ecuador, Bolivia, and Peru.

Water For People “works to build a world where all people have access to safe drinking water and sanitation, and where no one suffers or dies from a water- or sanitation- related disease”. This organization is unique in that they work with local people and partners to develop innovative and long-lasting solutions. Water For People has found that involving the community, local governments, and local non-governmental organizations at the beginning of a project results in a successful and sustainable project.

For example, in the year 2000 in Galufu, Malawi (a community of 1,700 people) Water For People collaborated with Malawi Freshwater Project, a local NGO, to develop four wells fitted with Afridey hand pumps and to construct household pit latrines. The availability of safe water and improved sanitation significantly improved the living conditions and health in the village. The now healthy and empowered villagers employed the organizational techniques taught to them by Water For People during the well/sanitation project to work together to develop a sophisticated composting system. The compost is used

to fertilize trees to help stop the deforestation in their community. Water For People along with the village chief and local government approached Malawi’s Ministry of Forestry to obtain tree seedlings to repair the deforested areas and were granted 48,000 seedlings in 2008. The trees are now selectively harvested and some of the profits from the tree sales are used to construct more household latrines and fund water pump repairs. Currently, Galufu’s sanitation coverage is at 85%, only 15% shy of their goal of 100%.

The North Carolina (NC) Water For People Committee supports Water For People in several ways; 1) organizing fund raisers to provide monetary support for project implementation, 2) participating in World Water Corps to provide technical support and documentation on existing water and sanitation systems in host countries, and 3) educating the public about the importance and benefits of implementing drinking water and sanitation projects in developing nations.

The NC Water For People Committee was formed in 1992 and has the distinction of being the first state-level committee formed to support the Water For People organization.

Over the years, the in-country role of the NC Water For People Committee has evolved from a hands-on project design and implementation effort to an observation, data gathering, needs assessment and planning effort for water and sanitation services. These opportunities to volunteer directly in the host countries are

made available through Water For People’s World Water Corps program, and participation is open to anyone. The World Water Corps program matches host country needs with each Water Corps volunteer’s skill set.

One example of a World Water Corps mission is collecting data for the Field Level

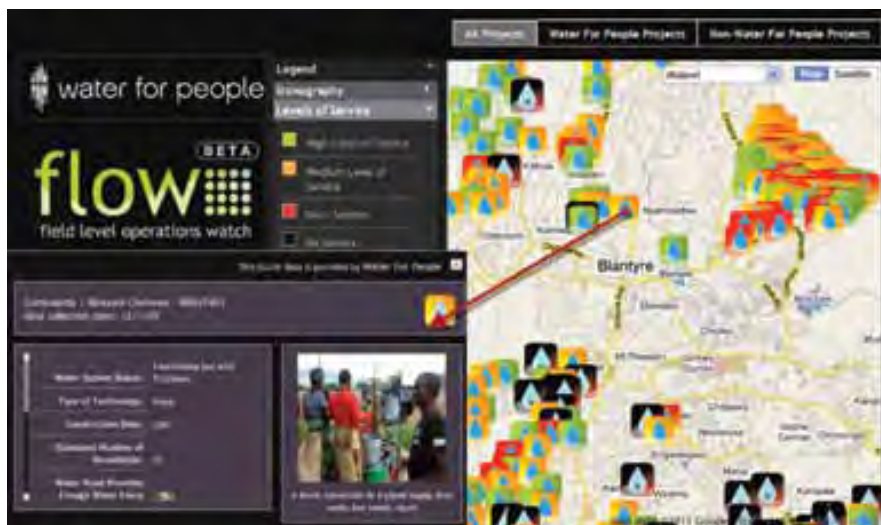


Figure 1. FLOW displaying system service level for Mbayni-Chemusa Community in Blantyre Malawi



(L to R) NC Water For People volunteers Tricia Drummey and Susan Dunn registering runners at the 2011 5K Run.



2008 World Water Corps Bolivia Advocacy Outreach Mission: Crystal, Ilke and Reed in the Bolivia Water For People office for a morning brainstorming session.



2008 World Water Corps Bolivia Advocacy Outreach Mission: Bolivia Water For People staff members and NC Water For People Volunteers at Friday night blessing of the office.



Players survey their next shot at the 14th annual Water For People golf tournament, which is held each year at the Colonial Country Club in Thomasville, North Carolina.

Operations Watch (FLOW, <http://watermapmonitordev.appspot.com/>). Information collected by the volunteer during the monitoring trips is compiled in a dynamic format for use by Water For People in assessing needs. Water For People makes the information available to everyone so that it can be used by local governments, partners, donors and the public. The data found on FLOW provides a clear view of what systems are working; needing repair and what are broken. It provides a baseline of the systems and accountability to the governments. The data is collected using Android cell phone technology and Google Earth software- giving immediate viewing ability on FLOW, it is easily understood (Figure 1) and will lead to better water and sanitation system solutions.

In 2007 the NC Water For People Committee was assigned the unique task of developing an advocacy, outreach and communications tool for the Bolivian in-country office of Water For People. Our committee was assigned this task because of our strong relationship with in-country staff in Bolivia (for more details, see *NC Currents* Winter 2009). This task is ongoing and several NC AWWA-WEA members – Tricia Drummey, Lisa Edwards, Michael Parker and Jackie Jarrell – will be returning to Bolivia this year to continue its implementation.

Committee members who are not available to participate in World Water Corps contribute in other ways. During each of our bi-monthly meetings, members work on the fundraising projects that provide much-needed revenue to Water For People. NC Water For People Committee organizes an annual 5K run held each May in Charlotte, a golf tournament held each Fall at the Colonial Country Club in Thomasville, and a silent auction and raffle held during the NC AWWA-WEA Annual Conference. The silent auction raises funds for the World Water Corps volunteers. We are also attempting to re-start a Geocaching fundraiser. Our fund raising efforts generate approximately \$13,000 dollars a year that Water For People uses to fund in-country projects. This year our committee is supporting a very unique fundraising opportunity initiated by Kraig Kern, Climb for Water (for more details, see *NC Currents* Spring 2011). Climb for Water has a goal of raising approximately \$20,000 and reaching over 1,000 people through Facebook (www.climbforwater.org).

In addition to fundraising, our members engage in outreach and education efforts, teaching about the need for safe drinking water and sanitation facilities and how Water For People is working to improve the lives of those who do not have easy access to the facilities many of us take for granted. Our members participate in Engineering Week by going to elementary, middle and high schools around the State to educate students about water and wastewater engineering, NC AWWA-WEA, and Water For People. Our committee has also organized a Model Water Tower Competition held annually in Raleigh.

If you are interested in joining the North Carolina Water For People Committee, please contact our Chair, Ilke McAliley, at (704) 338-6794 or ilke.mcaliley@hdrinc.com. For more information on Water For People or World Water Corps, please visit the Water For People website (www.waterforpeople.org).



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Human and Educational Resources



Mandy Smith-Thompson Know Better, Do Better

It has been said that more than 75% of people think that water from storm drains empties directly into the sewer system and is then cleaned. “They don’t realize that storm drains connect directly to a body of water,” says Mandy Smith-Thompson, Environmental Educator for the City of Concord. She adds that a lot of times, the most atrocious things that people do, that have the nastiest impact on the environment, happen because they are uninformed.

“When you know better, you do better,” says Smith-Thompson, quoting Maya Angelou. Whether it is through presentations to her colleagues, activities in local classrooms, environmental-focused fairs, or a swap shop on Facebook, the Environmental Educator is busy teaching others about environmental stewardship.

Her work with the City of Concord falls under three areas: the Solid Waste and Recycling Department, The Water Department and the Stormwater Department. “I work to help people understand why and how to conserve water; what is storm water and how to prevent pollution; and why it is important to recycle and how to do it,” she sums up.

In fact, her work involves much more. One of her recent initiatives has been the Outdoor Explorers Program. Inspired by the No Child Left Inside movement—which focuses on encouraging children to engage in unstructured outdoor play—Smith-Thompson partnered with Concord’s Parks and Recreation Department to launch an outdoor program for children aged nine to twelve.

Fear of predators and increased urbanization is leading society to discourage children from going outside to play. Smith-Thompson believes Concord is no exception. “I thought, what can I do as an environmental educator to make a difference for kids?” she explains. “So I developed the first Outdoor Explorers program called Meeting Mother Nature to get kids outside using their senses—looking, touching, listening and smelling.”

The program is held at a recreation centre located next to a small stream. After handing out nets and vials, Smith-Thompson encouraged the children to explore. “It was clear that a lot of kids had never walked in a stream before,” she recalls.

Using recycled paper, the children also made nature journals. At the end of the day, the children were given time to reflect and report what they had experienced that day.

If Smith-Thompson knows the importance of spending time outdoors, it is because of the impact her experience with nature has had on her own life. As a child, she remembers her mother stopping the car to move turtles out of the road or enlisting her help to rescue frogs from the filter of the backyard swimming pool.

One day, her mother caught Mandy stepping on an anthill outside. The response was unequivocal. “My mother said to me ‘that little ant worked really hard to build that mound and you messed it all up. I better not catch you doing that again.’ And she never did.

Instead, Mandy Smith-Thompson grew up to develop a deep love and respect for animals. Because of those feelings, the young girl soon decided that she wanted to become a veterinarian.

When her first attempt at admission to veterinary school was unsuccessful, she changed her focus to marine biology. But by that time, it was too late in the year to find a faculty mentor for the graduate research program. While waiting for a spot to open, she entered into the graduate school’s certificate program in environmental studies.

At the same time, she started working with Carolina Ocean Studies, a company in Carolina Beach near Wilmington. The company charters large fishing vessels to take children on environmental field trips. Smith-Thompson remembers pulling the trawl net behind the boat, catching marine animals then explaining to the children what they had caught and why each was shaped the way it was. “I would also tell them how they could protect these animals by living their lives in such a way as to minimize polluting the environment,” she recalls. “It was then that I learned I really liked teaching.”

In the end, Smith-Thompson decided to forego the masters program and focus on her graduate certification in environmental studies. Then she headed back home and went to work for the City of Concord.

Four years later, Smith-Thompson notes that her early years only marked the beginning of her education. Since graduating, she has constantly continued learning. Recently, she completed her certification with North Carolina Environmental Educa-

tor Certification Program, learning about various curricula including those developed by Project Learning Tree, Project Wet and Project Wild.

She incorporated the content from these projects into Concord's Outdoor Explorers Program, Mother Nature's Friends. Focused more on specific animal species, the program invited children to explore coloration and camouflage, along with building birdhouses and toad houses from recycled materials.

One of the children's favorite activities is a relay race in which they pretend to be birds picking up worms—actually different colored pasta. This leads to a discussion of coloration and food selection as well as the production of a graph. "Environmental education is very fluid," Smith-Thompson points out. "It incorporates many subject areas including math, science and language arts." Thanks to their natural curiosity for nature, children can often plug in more easily via birds and worms than numbers and textbooks.

This versatility is also useful for teachers who call on Smith-Thompson to present an environmental education component in their classrooms. "I try to tailor what I am teaching to the curriculum requirements for that grade level," she explains.

Smith-Thompson adds that she also welcomes requests from church groups, gardening clubs and "anyone that will listen." In fact, she was instrumental in organizing the Viva Verde Earth Fest, a joint initiative between the City of Concord, Cabarrus County and the City of Kan-

napolis. Launched in April 2010, the annual festival features music, vendors, children activities and information tables staffed by local municipal representatives.

But this is not the only way Smith-Thompson is ensuring the people of all ages become informed about the work of the Water, Stormwater, and Solid Waste and Recycling Departments. Every spring and fall, she tours the schools delivering presentations for the City of Concord's Civic Education Program aimed at third grade students within the city limits. As part of the same program, students take a field trip tour of city facilities.

For the rest of the public, a similar program called Concord 101 explains how local government works. Besides delivering presentations for these programs, Smith-Thompson also talks about the work of the Stormwater and Solid Waste Departments to her 900 colleagues at the City of Concord. "It gives me a chance to tell my co-workers what stormwater is and how they can prevent stormwater pollution," she explains, adding that she gets a chance to talk to her colleagues about recycling during 'Litter Sweep,' held twice a year.

Recently, she also held a Recycled Craft Lunch and Learn at work. Within an hour after sending the notice to her colleagues, the class was full. A self-described 'crafter,' she is passionate about using 'repurposed' materials. "Recycling materials is second best," she notes. "Better still is to reuse."

She laughs as she recounts how after she and her husband found snippets of copper wiring on the job site for their new



house, her friends received hand-made copper rings as gifts. Those who know Mandy Smith-Thompson say that she certainly practices what she preaches. Whether it is taking her own bags to the grocery store or making her own environmentally-friendly cleaning products, she exemplifies environmental stewardship by the way she lives.

Those early lessons have remained with her and shaped both her life and her life's work. Recently, she saw several harmless black rat snakes dead in the driveway at work, she feared they may have been ran over intentionally, due to a common, irrational fear of snakes. So, she invited a local park ranger to make a presentation for her coworkers. "Having more info on 'scary' animals sometimes makes them less scary," she explains, pausing for a minute before returning to her favorite quote. "It's really true. When you know better, you do better." [✕](#)

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Human and Educational Resources



Blue Planet Water Environmental Center

The door of the Blue Planet Water Environmental Center opens onto a world where the story of drinking water and wastewater becomes as real as the rain that falls from the sky. Since the hands-on learning center first opened in December 2003, more than 10,000 visitors have had the opportunity to operate a centrifugal pump, locate an underground pipe, learn about the water cycle, and do much, much more.

Housed inside the Lee S. Dukes Water Treatment Plant (formerly the North Mecklenburg Water Treatment Plant) in Huntersville, the 9,800 square-foot center features dozens of interactive learning stations that allow children of all ages to explore one of our most precious resources. Visitors can learn how water gets to a faucet, what happens down a drain, how to test for water quality, and how to protect the environment and conserve water.

Exhibits are aimed approximately at the grade five level—with some simpler and others more complex—because the school system targets much of its environmental education to this age group. “But everyone of any age can get something from the exhibits,” notes Vic Simpson, Communications Manager for the Charlotte-Mecklenburg Utility Department (CMUD). “We have people of all ages come through the facility.”

Both children and adults appreciate being able to view models of water and wastewater treatment plants while participating in activities such as finding leaky pipes, turning valves on hydrants, and

following a TV camera down a wastewater pipe. They also have the opportunity to discover the secrets of the Catawba River Basin while learning about everything from proper grease disposal to protecting drinking water sources downstream.

Everything is carefully conceived to educate visitors not only about the water cycle but also about the role utilities play in protecting regional water sources, public health and the environment while supporting the community and economy. Simpson points out that it took about a year to conceptualize the displays and build the exhibits.

The vision for Blue Planet evolved during the design and construction of the Lee S. Dukes WTP in the in the early 1990s. (Today CMUD provides drinking water to about 788,000 customers across Mecklenburg County.) Valuing public education as part of its mission, the utility set aside space for an education center when designing the WTP, which opened in Huntersville in 1998.

“As a utility, we are a steward of our natural resources as well as our water and sewer infrastructure,” explains Simpson. “We worked together to create a hands-on, one-stop destination point for educating children and citizens about the value of clean water.”

The Mecklenburg County Land Use and Environmental Services Agency was instrumental in helping obtain a Federal EPA grant through the Surface Water Improvement and Management (SWIM) Program. Thanks to the special \$475,000 grant and \$100,000 invested by CMUD, construc-

tion of the educational center began in early 2003 and was completed later that year. The contractors met with utilities employees from both the water and wastewater side of the operations for guidance on putting together meaningful exhibits and hands-on displays.

In fact, utilities employees continue to play an active role in the center. Employees are trained to act as ambassadors, either volunteering to give tours of The Blue Planet or going out to give presentations. Long before opening the center, the utilities department had a public outreach program comprised of school, civic and neighborhood presentations as well as plant tours. “We integrated these efforts with The Blue Planet when it opened in 2003,” notes Simpson, adding that today the utilities department refers to all its public education efforts as the Ambassadors Program.

In total, Ambassadors events have numbered in the hundreds, reaching thousands of people each year. It is true that CMUD has had to scale back some of its public outreach due to a recent reduction of staffing resources. Nonetheless, there were 32 tours of The Blue Planet last year, with 1600 people visiting the center.

Tours are available by appointment. Part-time lead coordinator Kathy Riley books all the tours and delivers many of them herself. She is supported by a team of several employees—all with regular assignments in CMUD. Annual operations are funded through CMUD’s operating budget which is 100% supported by water customers.

The utility is proud to be able to include

Human & Educational Resources




The Blue Planet among the services it provides its community. The center has hosted a broad variety of community groups, from schoolchildren to senior citizens, from girl scouts to high-level civic leaders. "Blue Planet tours are often combined with other onsite presentations and events," says Simpson, noting that the WTP also has several meeting spaces.

He adds that the center has also become a popular stop for visitors to the area,

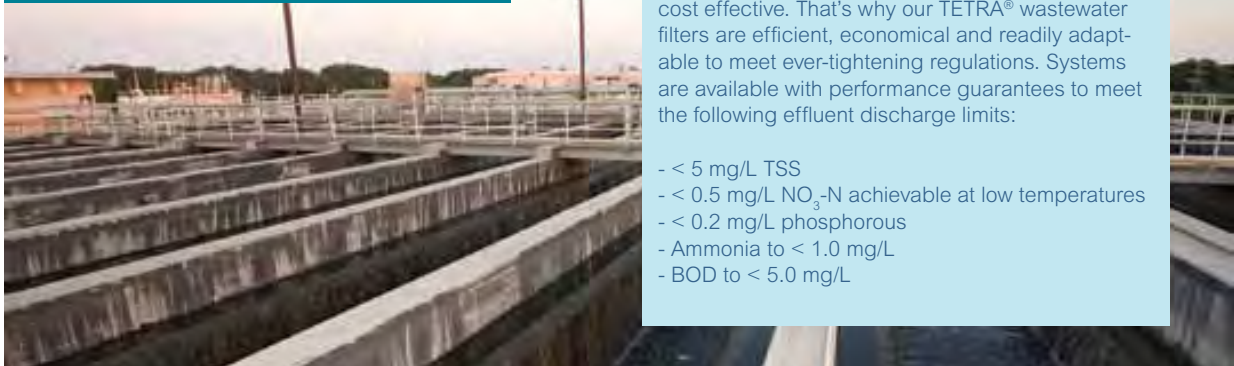
including foreign dignitaries. "The center was designed as a public education flagship," notes Simpson. "When we opened The Blue Planet, there were very few, if any, hands-on education centers devoted to water systems anywhere in the U.S."

In 2004, CMUD received a National Environmental Achievement Award from the Association of Metropolitan Sewerage Agencies (AMSA), recognizing excellence in the Public Information & Education Pro-

gram Category for the utility's development of the center.

Over the years, several water utilities and municipalities have contacted CMUD to inquire about the process of funding, designing, building and operating an educational center like The Blue Planet. "We are proud to be a pioneer in this area," says Simpson. "Our plan is to continue offering our programs now and long into the future." 

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Ultraviolet (UV) Technology FOR MUNICIPAL WASTEWATER

By Jon McClean and Patrick Bollman, P.E. – Engineered Treatment Systems (ETS), LLC.

Ultraviolet (UV) disinfection is now a standard feature in many wastewater utilities. UV has also been adopted by the drinking water community, as a barrier against chlorine tolerant species such as *Cryptosporidium* and *Giardia*. The technology is widely favored due to its non-chemical nature, the fact that no subsequent de-chlorination process is required, and its ability to be unselective in disinfection performance.

UV Science and Validating Performance

UV light works by causing permanent damage to the DNA found in all living species. Once the DNA becomes damaged, or dimerized, the organism is unable to carry out the routine cell functions of respiration, the assimilation of food, and replication. Once the cell is rendered non-viable the organism quickly dies. The difference in efficiency of UV systems from different UV manufacturers was made transparent with the advent of UV system validation using bioassay techniques.

A bioassay involves the introduction of a non-pathogenic organism (biosimulator) into the fluid stream before the UV system. Examples of biosimulators include: MS2, T1, and T7. The entire procedure is performed under controlled conditions, and each of the system variables: flow, transmittance, power loads and lamp intensity are carefully recorded, as samples are taken pre and post the UV system. Once the sample data is returned from the analyzing laboratory the actual system ability to disinfect can be compared to the manufacturer's claims. Of course bioassays should be carried out under the auspices of a credible third party.

As bioassay validations became more the norm, engineers started to notice that the water hydraulics play a vital and often



ETS lamp connections and external wiper motor

over looked role in system performance. In essence if a UV system design allows short circuits, or poor flow paths, then the water will receive differing degrees of UV dose. In extreme cases, the water can short circuit straight through a UV system, rendering it grossly inefficient. Most UV systems need to cope with a variety of flowrates, and usually an operating flow range is considered when designing the UV system.

Closed Vessel UV Systems Advances

The standard in the municipal wastewater industry is to put UV lamps in an open channel configuration. The industry went with this original configuration because early municipal adopters of UV disinfection retrofitted their chlorine contact basins. Even today when new plants are constructed, the norm is to install an open channel UV system because of familiarity. However, there are alternatives available for UV disinfection

including closed vessel reactors with high-powered amalgam or medium pressure lamps.

Early closed vessel reactors received poor grades because they were fitted with large amounts of low pressure lamps and did not have an automatic wiping mechanism. Today's closed vessel UV chambers are much different than the early systems as they are fitted with high-powered amalgam or medium pressure lamps, automatic wiping mechanisms, air release valves, and hatches to gain access to the interior of the chamber. In fact, municipal wastewater applications are the only primary users of open channel UV systems. Municipal water, industrial process water, swimming pools and water parks, and ballast water (just to name a few) all utilize closed vessel UV systems.

There are many benefits for treatment plant operators and consulting engineers in designing and operating a closed vessel UV systems.

Installation

- **Lower installation costs and easier and quicker installation.**

Closed vessel systems can be thought of as a spool piece in a pipe. The systems are fitted with ANSI flanges and can be installed as a contractor would install plant piping. There is no need for pipe support directly under the chamber as pipe supports can be added to influent and effluent piping. Closed vessel chambers eliminate the need of precision alignment of poured concrete walls and floors. Some estimates are that closed vessel UV systems can reduce contractor installation costs by up to 80% for UV installation.

- **Chambers can be installed in horizontal or vertical pipe runs.**

Allows consulting engineers greater flexibility when designing a new or retrofitting an existing treatment plant. Vertical installations lead to a smaller footprint and no air entrapment, but will require additional head for gravity fed systems.

Maintenance

- **Wiping mechanism is external to water.**

Systems are typically fitted with a fractional horsepower motor external to the chamber and water. The motor is coupled to an internal threaded screw which turns and drives the wiping carriage across the quartz sleeves and UV intensity monitor. It is critical to keep all optical paths free from fouling to ensure optimum disinfection.

- **Wiper rings can be replaced without removing wiping carriage from chamber.**

Systems with access hatches allow operators to replace wiper rings

without ever having to remove the complete wiper assembly.

- **Individual lamp and sleeve replacement.**

Design allows for operators to replace lamps without draining the chamber and allows replacement of individual lamps with relative ease. The lamps are removed without any contact to effluent thus reducing the chances of disease or infection. Though to replace the quartz sleeves, the chamber will need to be drained. However, each sleeve can be replaced individually without having to handle multiple at one time.

Safety

- **No open water surfaces.**

Open water surfaces can lead to fly and mosquito nuisance, as well as cause corrosion of electrical components due to elevated humidity. Operators can lose tools, cell phones, etc. that get drop into the water. Sunlight causes algae to grow, and also stimulates an enzyme that can repair (photorepair) DNA damage caused by the UV system. Inhalation risk for operators from aerosols containing pathogenic organisms is barely understood but can have long term health concerns.

“The technology is widely favored due to its non-chemical nature, the fact that no subsequent de-chlorination process is required, and its ability to be unselective in disinfection performance.”



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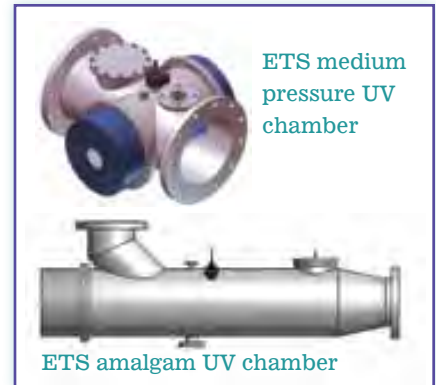
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• **Reduced UV exposure.**

UV light will burn exposed skin in seconds, causing erythema (sunburn). Burns to the inside of the eyeball, sometimes called arc eye or welding flash are extremely painful and can lead to retinal lesions, cataracts, and yellowing of the lens on prolonged exposure. Closed vessel UV systems are designed to keep this damaging light internal to the chamber, thus reducing the chance for exposure.



In Summary

A persuasive case can be made to put the UV system for wastewater disinfection into a closed pipe like every other application that uses UV. This ensures optimized hydraulics and keeps the operators from exposure to UV and wastewater. Companies such as ETS have reactors up to 30 inches in diameter designed specifically for wastewater disinfection. [EZ](#)

About the Authors

Jon McClean, President at ETS. After receiving his degree in physics, Jon has been actively involved in the UV industry for over 20 years including roles as a Managing Director for a European UV company and President of a US based UV company. (jon.mcclean@ets-uv.com)

Patrick Bollman, P.E., Municipal Operations Manager at ETS. With a BSCE degree from the University of Cincinnati, Patrick has been actively involved in the UV industry for 10 years. Currently he is involved in equipment design, equipment selection, managing a representative network, and validations. (pbollman@ets-uv.com)

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**UNDERSTANDING
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Ecological Flows:

What Does This Mean for Your Utility?

Jamie Robinson, CH2M Hill

Surface water provides a valuable water supply for North Carolina's communities, farms, and industries. It is used to generate power. It is also the sustaining life for aquatic ecosystems. The state of North Carolina is taking steps to strengthen its water supply and water withdrawal planning processes. Currently, North Carolina has no water withdrawal permitting process. As future water withdrawals are planned, the instream flows of the waterways will be a part of the planning equation. The importance of protecting certain instream flows for the protection of aquatic ecosystems is well documented; how they are defined and balanced with the need for other stream uses such as public water supply differs among states.

In North Carolina, there is not a 'one size fits all' approach to determining ecological flows as stream characteristics, and their inherent ecological conditions vary considerably from mountain to piedmont to coastal plain and by stream size.

How we got here

Session Law 2010-143 (SL 2010-143 also known as House Bill 1743) directed the North Carolina Department of Environment and Natural Resources (DENR) to develop a hydrologic model to simulate stream flows for each of the 17 major river basins in the State. Included in this law are the definitions of "ecological flow" and "ecological integrity" and the establishment of a Science Advisory Board (SAB), as the hydrologic models would not, by themselves, capture the nuances of a water body's ecological flows.

As defined in SL 2010-143, ecological flow is the "stream flow necessary to protect ecological integrity." This definition then requires a definition of ecological integrity: "the ability of an aquatic system to support and maintain a balanced, integrated, adaptive community of organisms having a species

composition diversity and functional organization comparable to prevailing ecological conditions and, when subject to disruption, to recover and continue to provide the natural goods and services that normally accrue from the system."

Or in summary, instream flows determine the amount and types of available aquatic habitat, which in turn determines a stream's biota. An aquatic ecosystem should bounce back from the normal variety of water flow, water quality, and weather pattern variations -including droughts - as species have adapted to certain patterns. Other factors influencing aquatic ecosystems include riparian and watershed changes (i.e. land uses).

The task of developing the hydrologic models and incorporating ecological flows into the planning process falls to the Division of Water Resources (DWR) within DENR. To provide technical expertise to the process, the role of the Ecological Flows SAB, as defined in SL 2010-143, is to: "advise DENR [specifically Division of Water Resources] on approaches to characterize the aquatic ecology of different river basins and identify the flows necessary to maintain ecological integrity" and "focus on methods of determining flows necessary to maintain ecological integrity."

Now that ecological flows have been defined, and we understand that ecological flows help to maintain diverse aquatic communities, let's consider the components of ecological integrity:

- hydrology
- habitat
- biota

It's the role of the SAB to understand these components and advise DWR on how to assess each of these in order to assist in the future process of planning water withdrawals. Site specific studies may not be feasible, and likely would be costly, so it is important to understand these relationships. Ecological integrity is being discussed in the context

of larger streams, which are or potentially could serve as water supply.

The creation of a hydrologic model for each river basin, as set forth in SL 2010-143, addresses the hydrology component. These hydrologic models, using historical precipitation and stream flow data in their development, simulate flow responses to precipitation and typical seasonality in flows. Patterns associated with seasonal instream flows are typically captured with United States Geological Survey (USGS) gages. This variation plays a large role in channel stability and instream flows. For instance, high flows trigger such ecological responses such as fish spawning while lower flows trigger other responses and could stress the ecological system.

How is the SAB approaching these questions?

To understand where we're going, we reviewed where we've been. The SAB spent the spring reviewing how other states account for ecological flows and considering different aspects of flow such as seasonality, instream velocities, and whether or not streams within the state could be classified based on their hydrological characteristics. A stream's hydrograph also influences sediment transport and channel geomorphology, affecting instream habitat. Efforts to determine a stream classification system specific to North Carolina are underway. The DWR, with support from the Environmental Defense Fund, analyzed USGS gage flow records for unaltered streams creating eleven classes of flow regimes. These classes range from fast, shallow streams typical of the mountains to flashy streams influenced by urbanization. It is expected that similar species guilds and communities would be found within these similar classes of stream flows.

Another example methodology, which is often used in the hydropower licensing

process, is Instream Flow Incremental Methodology (IFIM). The basic premise of this model, which has been used in North Carolina, is the quantification of total available habitat by tracking both wetted perimeter of the stream over time and various segments of differing habitats across a stream at any given point. The availability of these different habitat types is dependent on flow. Other methodologies will likely be considered as the SAB continues its work.

The Eno River was previously studied using IFIM and can be used with DWR's stream classification system, and therefore is being revisited as part of the SAB evaluation. Work done years ago with IFIM was revisited by the DWR; recently the site was toured by the SAB in the context of how ecological flows could be established given the diversity of habitat created by flow. The Neuse River hydrologic model will also be used in test applications.

How will the SAB incorporate all the components of ecological integrity?

As the SAB moves forward in the process, incorporating the composition and health of aquatic ecosystems into the overall process will be considered. Discussions about various habitat needs of freshwater mussels, fishes, and macroinvertebrates

have also been a part of the dialogue. The IFIM process, for one, often focuses on a target species and guilds. DWR's stream classification process has not yet been compared to biological data. The SAB is tasked with considering the overall ecological integrity of a system, so allowing for monitoring data from DENR and others into the process is helpful.


To maintain ecological integrity it is important to understand the importance of these flow variations, as simply establishing a minimum instream flow (such as 7Q10) is not sufficient. It is unlikely that the environmental 'set-aside,' or ecological flow that shall not be allocated for another use, will be a stagnant value.

What is next?

The SAB will make recommendations to DWR on how to incorporate appropriate methodology to determine the ecological flows necessary to maintain ecological integrity in a given system, with a goal of wrapping up in 2011. Along the way, the SAB is continually thinking about ecological flows in the context of larger streams which could be suitable for water withdrawals.

This overall process will not be complete once the SAB makes its recommendations. The 17 hydrologic models are to be approved by the Environmental Manage-

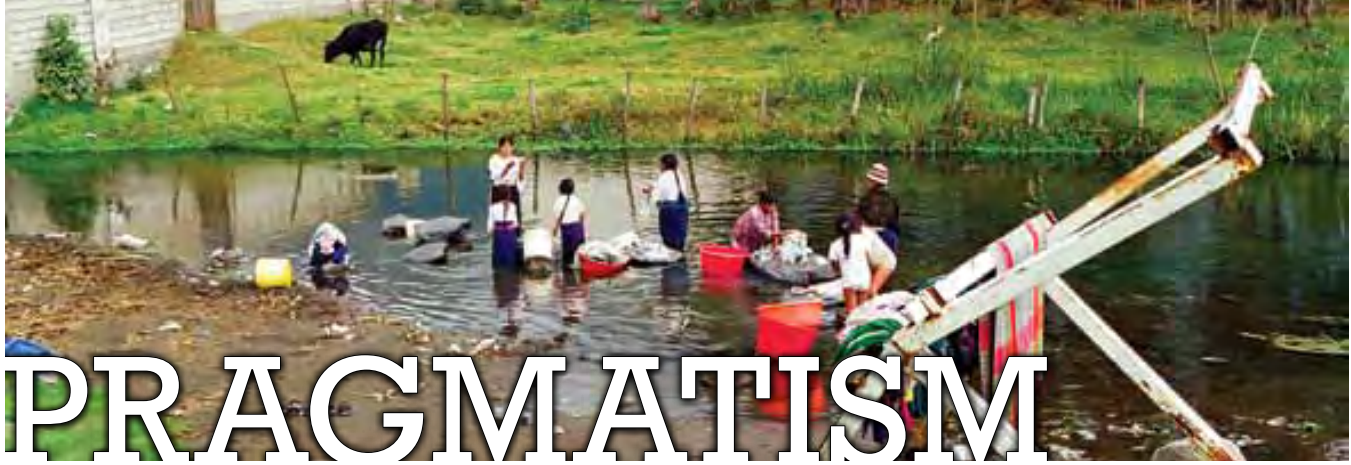
ment Commission. Following the work of this SAB, a policy advisory board will likely be established, whose responsibility will be to advise on the application and implementation of the rule and how it would be used as part of the process to permit new or expanded water supply allocations. Water utilities should continue to eye this process, and be involved in the state's determination of allocating, planning for, and permitting future water withdrawals. The science supports North Carolina's definition of ecological integrity; now it is up to DENR with support from its advisory boards to establish the process by which ecological integrity will be maintained while meeting the water supply needs of a growing North Carolina population.

Meeting minutes, the SAB charter, materials from various states, and others such as the Eno River case study are all available from the DWR's Ecological Flows SAB website: http://www.ncwater.org/Data_and_Modeling/eflows/ 

Author Bio

Jaime Robinson is NCAWWA-WEA's representative on the North Carolina Ecological Flows Science Advisory Board and a Project Manager with a diverse array of water resources management experience in CH2M HILL's Charlotte office.





PRAGMATISM

Innovative Approaches to Sanitation Marketing In Bolivia

by Kate Fogelberg, Water For People

Many people think the global sanitation crisis will be solved by building toilets for the estimated 2.6 billion people who do not currently have them. But for those of us working in the developing countries—who time and time again see toilets that are never used, are abandoned once full, or are even used as chicken coops—getting people to change their behaviors is much harder than slapping some cement and bricks together in the form of a toilet.

Enter sanitation marketing. Sanitation marketing applies commercial marketing techniques to persuade people to change their behavior by using and maintaining a toilet. Traditional social programs, including toilet construction projects, usually are based on either education or coercion: people will want and use toilets “once they know what is good for them,” in the case of education, or to avoid a monetary fine or social exclusion, in the case of coercion. Once a project is approved, a series of

workshops or other educational activities typically occur in which the benefits of toilet use are explained. The messages are nearly universal that using a toilet is good for your health and communities are assumed to be homogenous entities. The exact same toilet model will be built for everybody in the community... if the project budget is sufficient.

Sanitation marketers, however, would take a completely different approach. Instead of taking the point of view that the implementing agency has all the answers and needs to teach or persuade people to use toilets, they will start by doing their homework. First and foremost, they will find out why people do or do not even want toilets, as opposed to assuming that with just the right combination of information and coercion a community will accept and forever use their generously donated toilets.

In the community of San Pedro, Bolivia, it would be easy to assume that everybody is much the same: rural and poor.

But that’s just not true. A truly sustainable sanitation program – one that allows people to choose the toilet they want, not just during a four-month trial cycle but forever, must consider why people want to change their behavior, or their motivations – not ours – and what is deterring them from doing so.

Meet Luisa. Luisa was a government health promoter for years and one of the first people to champion improved toilets in her community. Every year, from February to May, heavy rains coupled with a high water table meant that her neighbors’ feces literally flooded her kitchen. Luisa, who is a health promoter herself, repeatedly cites the inconvenience of having her neighbors’

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poop in her home four months out of the year as her personal "toilet motivator." Of course, there is nothing healthy about your neighbors' feces next to your breakfast, but speak to Luisa for more than five minutes, and deeper motivations emerge: disgust, inconvenience, and being considered a second-class citizen.

Even within the same household, husbands and wives can have different motivators and constraints. Luisa's husband, who shares a toilet with Luisa, has different ideas. To him going to the bathroom was annoying; his favorite thing about the improved, elevated ecological toilet is that his rear end no longer gets wet when he uses the toilet.

From her own experience Luisa knows that not only toilet coverage, but toilet use by everybody, is needed to improve her community's health. As a volunteer, every month she takes her hygiene checklist and visits her neighbors to make sure they are doing their part for a healthy community by using their toilets and keeping them clean. Health, comfort, and convenience are what motivate Luisa.

Walk a few blocks, and you'll see Gladys's nursery before you see her. Fruit seedlings, ornamentals, and vegetables poke out of recycled yogurt and fruit juice bags. Gladys is an entrepreneurial mother of three who sees ecological toilets as not only improving the environment but also as a business opportunity. Always experimenters, Gladys and her women's group provide the key service of collection and reuse in the sanitation chain. The scientist in her is conducting experiments with different people's compost to see which mixtures of dry materials produce the richest results. She chuckles as she recounts her first experiment, in which she put undiluted urine on her plants and promptly killed everything! Not one to be deterred, she mixed and matched liquid and solid fertilizers on a variety of different plants. Improving her family's bottom line—not just keeping those bottoms healthy—is what motivates

Gladys. To her a toilet is not just where you take care of your business, it is the business!

And finally, coming up to one of the few brick houses in town, you will find Margarita, fresh from several years in

Spain. There is a saying in Bolivia that you can tell how long somebody has been

abroad by what their home looks like. Margarita put in her time working as a house-cleaner thousands of miles away to finally have the home she really wanted. To her a toilet shows status.

She lived in a developed country for years, where porcelain seats are not only the domain of the wealthy, but what every woman, man, and child sit on each day. Her old latrine stands in the corner of her yard, no longer used, a reminder of progress. A flushing, white toilet becomes the equivalent of a sports car—a status symbol—and it is obvious that Margarita's motivation for this

is very different from those of her neighbors Luisa and Gladys.

Many other examples abound, but the key is that Water For People—after asking hard questions about the sustainability of its own sanitation programs—is applying these successful commercial marketing techniques to the age-old problem of getting people, and more importantly keeping people, on the pot. [AC](#)

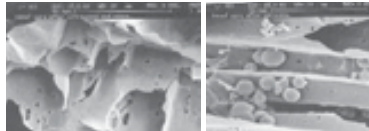
Kate Fogelberg is Water For People's Regional Manager—South America and Country Coordinator—Peru.

Surface Area and Attached Growth

An introduction to RF Wastewater's - Activated Sludge Kenaf -ASK

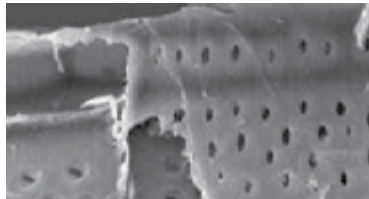
Interesting Facts:

We say Activated Sludge Kenaf has a surface area of +/- 650 square meters per gram. We base this on publications using BET/N2 and DR/CO2 methods. It is well known that Kenaf core is one of the world's most porous plant materials. Google a search term like "Surface area Kenaf Core"



Above are two photos of Kenaf taken at NC State back in 2002. (The line scale is 50 microns.)

Perspective on porosity: using two beakers, where one has 1000ml of ASK and one 1000ml of water, pour the water into the Kenaf and let it sit. Your absorbed volume will total +/- 1100ml.



Above is another close in shot of Kenaf. One can see these "holes" under a 100 power lab microscope when looking at sludge.

ASK in Activated Sludge

In an activated sludge wastewater system, we aim to *replace and maintain* 1/6th of the MLSS with ASK. *Replace* is the active word here, we do not *add* to your MLSS, we *replace* them.

A dry pound of ASK has about the same volume as a gallon of water. So, 50 pounds will have about the same volume as a fifty gallon barrel.



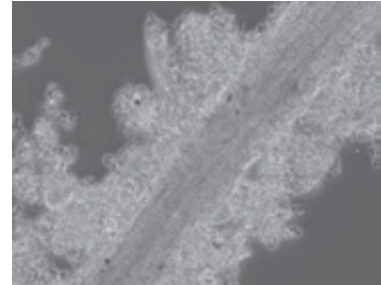
RF WasteWater

RF is a NC Based AgTech BioTech Company. Our lignocellulosic approach to adding surface area to activated sludge is proven and patented.

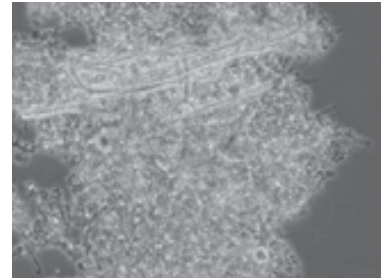
in Activated Sludge, (cont'd)

Let's say a 1 mgd plant has a basin volume of 2 million gallons carrying MLSS at 3000. We would *replace* 8400 pounds of MLSS with ASK. That is 168 fifty gallon barrels, or 3.8 million grams. Lots of surface area.

Do Microbes Colonize ASK?



Above and below are photos taken of Kenaf in activated sludge - real, actual, mixed liquor. These pictures show how microbes colonize the Kenaf. The top photo is a newer piece the bottom is a mature/degraded piece of Kenaf that has been in the mixed liquor longer



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Lee S. Dukes

A Legend in his Community

In Huntersville, North Carolina, the Lee S. Dukes Jr. Water Treatment Plant stands as a tribute to a legacy of public service embodied by the man for whom it was renamed in May 2005. Renowned for his work in water treatment, his dedication went far beyond the industry, leaving an indelible mark on the many lives he touched.

His friends at the NC AWWA-WEA remember a man who was generous with his time and thoughtful with his guidance. "Whether it was his church, the woodcarvers or the AWWA, he gave himself fully to whatever he was a part of," recalls Henry Forrest, a friend and colleague who was still accompanying Lee to association conferences earlier this year.

A charter member of the Select Society of Sanitary Sludge Shovelers (5S) Lee was also a lifelong member of NCWOA, WEF and AWWA. "Lee was tremendously active on NC AWWA-WEA committees," notes Barry Gullet, Director of Charlotte-Mecklenburg Utilities for the City of Charlotte. "He made significant contributions in areas such as the establishment of training standards for wastewater training."

From 1958 to 1961, Lee served as Director of WEF (WPCF). He later spent a term as Chair of NCWOA (1969-70) and then as Chairman of the NC AWWA the following year. For his work with the association, he received numerous accolades, including the Bedell Award (1967), Fuller Award (1976), Jarrett Award (1982) and 5 S (during the 1986, inaugural year). But no list of awards can do justice to the totality of all that Lee gave to the community during his lifetime.

"Mr. Dukes was a wonderful man," says Barry, "with a real passion for the life he lived, which included a loving family and a distinguished professional career dedicated to safe drinking water here in Charlotte and across our state, region and the U.S."

Henry explains from early in his career until the day he passed away on June 19, 2011 water was one of Lee's greatest passions.

Lee Dukes Jr. was born on May 11, 1920 in Branchville, South Carolina to Carrie Lucille Ott and Lee Stoll Dukes. After high school, he was accompanying a friend who was registering at Belmont Abbey College, when one of the priests offered to waive the expensive tuition so Lee could attend.

Two years later, he went on to Davidson College, earning a degree in chemistry and biology. Immediately after graduation he joined the U.S. Navy and, in 1944 married Doris Jean Neal. After the war, the couple returned to Charlotte where Lee eventually joined the Charlotte Water Department in 1948. It was the beginning of a stellar career and a lifelong dedication to professional service.

In 1949, Lee joined the Water Environmental Association (then known as the Sewage Works Association). That same year, he became involved in one of

the nation's first city-wide implementation of fluoridating drinking water to prevent tooth decay.

While working at the Charlotte Water Department, he completed a master's degree in public health at UNC-Chapel Hill. After a brief stint as Chief of the Engineering Section/Sanitary Engineering Division of the North Carolina Board of Health in Raleigh from 1965 to 1968, he returned to Charlotte, establishing a comprehensive lab at Charlotte-Mecklenburg Utilities (CMUD) and eventually becoming Director in 1974. By the time he retired in 1980, he had also played an instrumental role in extending water services to Mecklenburg, laying the groundwork for the eventual opening of the North Mecklenburg WTP.

Far from withdrawing from the field, after retirement Lee became even more dedicated to professional service. "Lee was a great person," recalls Joe Stowe, senior management consultant with McKim & Creed. "When Lee spoke, everyone that knew him understood the need to listen, because it was going to be sage advice."



A close friend of his father's, "Lee Dukes" was a household name when Joe was growing up. When he was asked to join a University of North Carolina plant operations sub-committee for water and wastewater curriculum development, Joe could hardly believe his luck. "I was being assigned to work with LEE DUKES!" he exclaims.

"Lee and I became friends and associates," he continues. "I later had the good fortune of serving as CMUD director after Lee, and often turned to him for guidance. He was always quiet, understanding and ready to help. Then later, he spent time at conferences with my oldest two children

who were in the utility business."

Henry points out that Lee was still attending conferences well into his eighties and nineties. To many, Lee and his late wife Doris were the cornerstones of the NC AWWA-WEA and were loved and respected by all who knew them. "He attended most every CMUD celebration and event – holiday parties, recognitions, retirements and dedications – and regularly took his friends, former colleagues, and fellow residents on tours of our facilities," recalls Barry.

A tour of the Lee S. Dukes Jr. WTP reveals something else about Lee. The facility is home to a collection of his celebrated

woodcarvings, a passion he pursued actively upon his retirement. For 25 years, he taught woodcarving classes, eventually forming the Charlotte Woodcarvers Club in 1982. He was recently honored at the club's 28th Showcase of Carvings.

When not busy volunteering in with water and woodcarving or as a Sunday school teacher for the Methodist Church, Lee spent time gardening, and visiting with his three children and many grandchildren. "He was so very proud of public service, and keenly aware of how clean water affects the lives of everyone," says Barry. "We will miss him very much." [w](#)

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News and Notes

2011 Stockholm Junior Water Prize Competition

The national Stockholm Junior Water Prize (SJWP) competition was held June 23-26 in Chicago. The competition hosted a great group of students and teachers again this year, with fifty projects entered into the competition.

The 2011 SJWP US winner is Alison Bick from New Jersey. North Carolina's Jenifer Brown was one of four other named finalists. Leila Musavi from Maine was not only a finalist, but was also the recipient of the new ITT Bjorn von Euler award for innovation, which includes a \$1,500 scholarship. WEF will be sponsoring the winner and finalists to attend WEFTEC'11 this October in Los Angeles. Jenifer will be entering her freshman year at Harvard in August, but will hopefully be able to attend the NC AWWA-WEA Annual Conference in November.

The number of entries in the North Carolina state competition has increased each year hitting a record of nine this year. This is a high level competition for which typical projects take months if not more than a year to develop, do the research and present findings. At the WEF SJWP Committee level current discussions involve ways for Member Associations to broaden their message and provide information to schools, teachers and students year round about the importance of water, the oppor-

tunities in our field, and the SJWP program as an early way to engage the next generation of professionals.

Report provided by David Wagoner from HDR who has served as the North Carolina SJWP State Organizer and provided information for this article. Starting in 2012 David will begin a three-year term as WEF's SJWP Committee Chair.

Industrial Connections

Water, wastewater and stormwater treatment/handling are not only the realm of municipalities. Industries of all types must address a wide variety of wastewater treatment issues for direct discharge to waters of the state and for discharge into sanitary sewer systems (regulated via pretreatment permits). Many industries treat municipally supplied water prior to use in their products. Stormwater management may be the most innovative area of environmental engineering for both municipalities and industries today.

These and many other water quality concerns unite the municipal and industrial worlds in the NC AWWA-WEA; hence, the theme of winter issue of *NC Currents* – Industrial Connections. Articles about any aspect of industrial water or wastewater treatment, pretreatment program interactions with industrial customers, and industrial water use and beneficial reuse

programs are welcome. Submissions must be emailed along with the Submission Form & Publication Agreement (available at www.ncsafewater.org) to Nicole Banks (nbanks@ncsafewater.org) no later than October 10, 2011.

An Early Case of Spring Fever Planning Ahead for the 2012 Spring Conference

The summer heat has disappeared and while we are enjoying the welcome relief of the cool, crisp fall air and anticipating the excitement of the upcoming holidays, let's take a moment to think beyond all of that to the return of moderate temperatures that will follow the blustery cold of winter. By the time spring rolls around you will certainly be looking for any excuse to get away, and NC AWWA-WEA provides the perfect solution and balance to work and play - our 11th Annual Spring Conference!

As you look ahead to your 2012 calendar, reserve April 15-17 to join NC AWWA-WEA at the Wilmington Convention Center for everyone's favorite spring event. Spring Conference Chair Mary Knosby and Vice Chair Paul Shivers along with their team of volunteers have been hard at work all summer making plans. Look for details about the Spring Conference to appear at www.ncsafewater.org, in eNews emails and in the next issue of *NC Currents* starting in January.

New Arrival

Congratulations to NC AWWA-WEA Membership Committee Vice-Chair Kelly Boone on the birth of her son Trevor.



Harry Siebert Receives AWWA Ambassador Award

NC AWWA-WEA member Harry Siebert was awarded the AWWA Ambassador Award during ACE this past June in Washington D.C. The Ambassador Award recognizes outstanding achievement in membership recruiting and is given to members who have earned a minimum of 500 Ambassador Award points and contributed to AWWA's growth. Mr. Siebert was the winner of the Maffitt Membership Cup for the NC Section AWWA in 1950 and 1952. Last year he graciously sent his Maffitt award to the NC AWWA-WEA office for display. Mr. Siebert is now retired and lives in Mars Hill, NC.

Mack "Buddy" Edmisten Retires



NC DENR Secretary Dee Freeman presenting Order of the Longleaf Pine to Buddy.

Long time NC AWWA-WEA member Mack "Buddy" Edmisten retired from City of Lenoir in June after 43 years of service. He started with the city in 1965 as a part-time grounds keeper, moved up to full-time water treatment plant operator in 1968 and then plant superintendent in 1984. For the last 6 years he has served as the city's first Director of the Public Utilities Department.

Among his many professional accomplishments during his career, Buddy is most proud of his work to help establish a state-wide water operator certification program. Beyond his service to the City of Lenoir, Buddy has been an active member of NC AWWA-WEA and NCWOA serving on both boards, and as an active committee chair and member in both associations. In 2006 NC AWWA-WEA inducted Buddy into the Select Society of Sanitary Sludge Shovelers (5-S) and in 1990 NCWOA honored him with the Operator of the Year Award. This year, Buddy received the prestigious Order of the Longleaf Pine authorized by Governor Bev Perdue.

Huber Technology, Inc. names Dana Hicks as President

April 26, 2011 - Huntersville, NC - Mr. Hicks comes to Huber with an expansive background in global business development and has experience in all aspects of the business environment including sales, marketing, strategic planning, operations, analysis and process improvements.

Mr. Hicks has a Bachelor of Industrial and Systems Engineering from the Georgia Institute of Technology; studied as an exchange scholar at the Technical University of Berlin (Germany), and completed management training at Allen-Bradley Management Institute as well as Northwestern University, Kellogg Graduate School of Management.

About Huber Technology, Inc.

Huber serves the municipal and industrial wastewater treatment market with high quality liquid-solid separation technology. Headquartered in Huntersville, NC, Huber Technology, Inc. is a member of the HUBER Group as a wholly owned subsidiary of Huber SE, based in Bavaria, Germany. For more information, visit <http://www.huber-technology.com>.

Kruger Educates the Future of Water Treatment

June 2011 - Cary, NC - Kruger, a Veolia Water Solutions & Technologies company, participated in Career Day at Northwoods Elementary School on June 2nd, 2011 in Cary, NC.



Fourth and Fifth graders learned about improving the environment and how communities can clean their water supply with the use of a sand ballasted clarification system.

Process Manager for Kruger Inc., Luke Wood, gave the students a look at the role of an engineer in environmental companies during his demonstration of the Actiflo® system. He also educated these potential future engineers on the importance of daily water conservation especially given the world's population growth and water scarcity concerns.

About Kruger

I. Kruger Inc. is a water and wastewater solutions provider specializing in advanced and differentiating technologies. Kruger is a Veolia Water Solutions & Technologies company. Visit the company's Web sites at www.veolianorthamerica.com, www.veoliawaterma.com and www.veoliawaterstna.com.

New Employees Announced at McKim & Creed

Raleigh - McKim & Creed announces that the following professionals have joined the company's Raleigh office:

- Sarah Frye, EI, comes to McKim & Creed as a structural engineering intern. She is a graduate of North Carolina State University with a degree in civil engineering. She is a member of the American Society of Civil Engineers, the Society of Women Engineers, and the National Society of Leadership and Success.
- Robin Kandl has joined the company as a senior mechanical designer. She earned a degree in mechanical engineering from North Carolina State University. Prior to coming to McKim & Creed, Kandl served as a mechanical engineering design intern at Altec.



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- Harmony Peacock is a front desk receptionist at McKim & Creed. She holds a degree in theater technology/design from Texas Tech University, and previously served as the head electrician at the Durham Performing Arts Center.

About McKim & Creed

McKim & Creed provides engineering, surveying and planning services to public and private sector clients via offices throughout the Southeast. The company's largest office is located on the Centennial Campus of North Carolina State University..

The Wooten Company 75th Anniversary Celebration Continues

An invitation-only golf tournament at Reedy Creek Golf Course in Raleigh in June commemorated the firm's milestone and honored the clients and individuals that contributed to the firm's growth and success over the years. "We at The Wooten Company owe a tremendous amount of respect and gratitude to all of our dedicated employees and the client partners we have had over the past 75 years," said Bucky Moore, president of The Wooten Company. "Without the hard work and persistence of our employees and the relationships we have forged with them and with our clients, we could not have achieved the successes that have helped us meet the infrastructure needs of communities all over the state."

As part of the anniversary celebration, The Wooten Company is reflecting on past successes including the construction of NCSU's Carter-Finley Stadium and their work with the Town of Granite Falls.

Carter-Finley Stadium, which has served as the home of the North Carolina State University Wolfpack football team for the past 45 years, was as much an engineering feat in the 1960s as it is a true Raleigh landmark today. Mr. Wooten and his staff (listed in the dedication program as "L.E. Wooten and Company, Consulting Engineers") were retained to oversee the design and construction process and were considered "In General Charge of Design." G. Milton Small and Associates were retained as Architectural Consultants, and Charles Kahn, a distinguished professor at the NC State School of Design, served as Structural Design Consultant. Yet, the project was heavily influenced by Wooten's staff, especially Marl E. Ray, P.E., who served as structural engineer and produced the bulk of the structural design construction drawings.

The Caldwell County town of Granite Falls and the Raleigh-based engineering firm have had a unique partnership since the 1970s, and the resulting water and sewer infrastructure developments have aided community development along the Highway 321 corridor. "The Wooten Company has been a valued partner for the Town of

Granite Falls for years, and their response to our needs has been more beneficial than we could have ever anticipated," said Granite Falls Mayor Barry Hayes. "They have provided viable solutions that will help us sustain our growth over the coming years." For the Wooten Company, the successful partnership with Granite Falls was one of the reasons the firm opened a branch office in Hickory. With a foothold in the local community, the firm was able to maintain efficient administration of these projects, as well as others in surrounding towns and municipalities.

About The Wooten Company

For the past 75 years, The Wooten Company has been dedicated to designing rural electric lines, water and sewer systems, building systems and community planning and development projects all over the state of North Carolina. Their services include sanitary/environmental engineering, general civil engineering, mechanical engineering, electrical engineering, community planning, architecture, landscape architecture, and GIS/mapping services. In addition, The Wooten Company provides project financing assistance for local government projects and, since the early 1990s, has helped raise over a quarter of a billion dollars in funds for infrastructure improvements and community enhancements. For more information, please visit The Wooten Company's website at www.thewootencompany.com.



Thanks its Grand Sponsors and many local volunteers for supporting a successful social event to welcome WEF Collection Systems Conference attendees to Raleigh!



Carolina Classics Social
June 12, 2011
Raleigh, North Carolina



NC Currents Future Themes

NC Currents is the official publication of the NC AWWA-WEA. Members, individuals and committees are encouraged to submit content for the magazine. If you would like to submit an article to be considered for publication in NC Currents please complete the Submission Form & Publication Agreement (available at www.ncsafewater.org) and email both the completed form and your article to Nicole Banks at nbanks@ncsafewater.org. Articles must be received by 5:00 pm EST on the listed submission deadline.

The editors of NC Currents welcome the submission of all articles related to the water and wastewater industry. Themes serve as general guidance for each issue, but articles are not limited to an issue's specific theme. Submission of an article does not guarantee publication. The Editorial Committee will review and select all articles and authors will be notified of the status of their submission.

WINTER 2012 Theme: Industrial Connections (Submission Deadline October 10, 2011)

Water, wastewater and stormwater treatment/handling are not only the realm of municipalities. Industries of all types must address a wide variety of wastewater treatment issues for direct discharge to waters of the state and for discharge into sanitary sewer systems (regulated via pretreatment permits). Many industries treat municipally supplied water prior to use in their products. Stormwater management may be the most innovative area of environmental engineering for both municipalities and industries today. These and many other water quality concerns unite the municipal and industrial worlds in the NC AWWA-WEA, hence, the theme of this issue – industrial connections. Articles about any aspect of industrial water or wastewater treatment, pretreatment program interactions with industrial customers, and industrial water use and beneficial reuse programs are welcome.

SPRING 2012 Theme: Water Sector Security (Submission Deadline January 2012)

As threats to the water sector change and evolve, so must our preparations and responses. The low hanging fruit may have already been picked, but our work is not complete. Protecting the investments made in infrastructure, consumer confidence and our natural environmental resources from manmade threats and natural disasters continues to be the heart of emergency preparedness and security-based risk reduction programs. The next generation of security upgrades will take a more concerted effort. Is there support from EPA and the state? Losing interest in security and emergency preparedness is not an option. Integrating security into all facets of our planning (e.g., engineering, design, construction) and our daily work routine will develop the culture shift necessary to achieve security of our water resources and inspire consumer confidence in our abilities. The Communication Committee is requesting articles on any aspect of emergency preparedness and security.

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Schedule of Events

The following schedule is current as of July 6, 2011. For updates or more information please contact the organization listed with each event. If no organization is listed it is an NC AWWA-WEA event, and details may be obtained by calling the NC AWWA-WEA office at (919) 784-9030 or visiting www.ncsafewater.org.

October

- October **NC AWWA-WA Industrial Committee Seminar Coordinate with PreTreatment Consortium Conference**
High Point, NC
- 3-7 **Water & Health Conference: Where Science Meets Policy**
Chapel Hill, NC
Margo Ginsburg, UNC Chapel Hill
(919) 966-7302
- 10-14 **NC AWWA-WEA Coastal Collection & Distribution School** Morehead City, NC
- 13 **NC AWWA-WEA Professional Wastewater Operators Committee Meeting – Western Region**
Hendersonville, NC
- 13 **NC AWWA-WA Industrial Committee Seminar Coordinate with PreTreatment Consortium Conference**
High Point, NC
- 15-19 **WEFTEC**
Los Angeles, CA
WEF (703) 684-2400
- 18-19 **NCWOA Seminar: Filter Assessment**
Forest City, NC & Morganton, NC
NCWOA (252) 764-2094
- 21 **Water For People Golf Tournament - Rain Date** Thomasville, NC

- 27 **North Carolina Water Treatment Facility Operators Certification Board (NCWTFOCB) Certification Exams**
Kinston, Morganton, and Raleigh
NCWTFOCB (919) 733-0379
- 27-28 **AWWA Customer Service Certification Program, Class 2**
Greenville, NC

November

- 3 **NCWOA Seminar: Collection & Distribution** Wilson, NC
NCWOA (252) 764-2094
- 10 **Water Pollution Control System Operators Certification Commission (WPCSOCC) Certification Exams (Application deadline: October 11, 2011)**
Keansville, Morganton, Raleigh, Salisbury, and Williamston
WPCSOCC (919) 733-0026
- 12 **NC AWWA-WEA Board of Trustees Meeting** Concord, NC
- 13-16 **NC AWWA-WEA 91st Annual Conference**
Concord, NC
- 16 **NC AWWA-WEA Board of Trustees Meeting** Concord, NC
- 17 **NC AWWA-WEA Professional Wastewater Operators Committee Meeting – Eastern Region**

December

- 1 **NC AWWA-WEA Seminar: Construction Issues in Today's Market**
Statesville Area
- 8 **NC AWWA-WEA Professional Wastewater Operators Committee Meeting – Central Region**
Cary, NC
- 13 **NC AWWA-WEA Seminar: Safety**
Wrightsville Beach, NC
- 13 **NC AWWA-WEA Seminar: Pipeline Assessment Tools**
Wrightsville Beach, NC
- 13-14 **AWWA Customer Service Certification Program, Class 3**
Greenville, NC
- 15 **NCWOA Seminar: Man vs. Machine**
Statesville, NC
NCWOA (252) 764-2094

March, 2012

- 12-16 **Eastern Collection & Distribution School**
Raleigh, NC

June, 2012

- 10-14 **AWWA ACE Annual Conference**
Dallas, TX
AWWA (800) 926-7337

July, 2012

- 16-19 **Maintenance Technologist School & Exams, Levels 1, 2, & 3**
Morganton, NC
- 16-20 **Western Wastewater School**
Morganton, NC

August, 2012

- 6-10 **Eastern Collection & Distribution School**
September, 2012

September, 2012

- 29- **WEFTEC**
- Oct 3 New Orleans, LA
WEF (703) 684-2400

October, 2012

- 7-9 **NCPC Annual Conference**
Atlantic Beach, NC
NC Pretreatment Consortium
- 15-19 **Coastal Collection & Distribution School**
Morehead City, NC

November, 2012

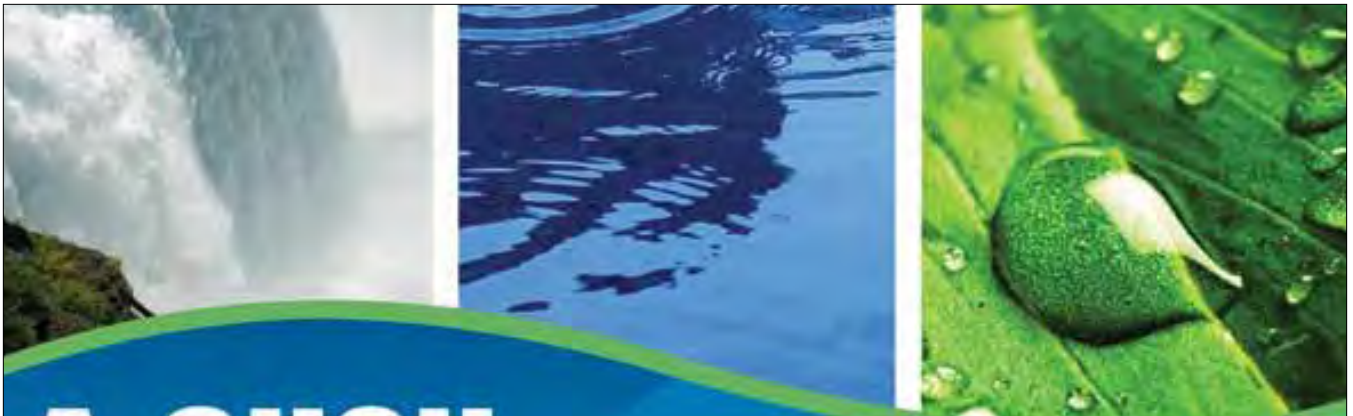
- 11-14 **92nd Annual Conference**
Raleigh, NC

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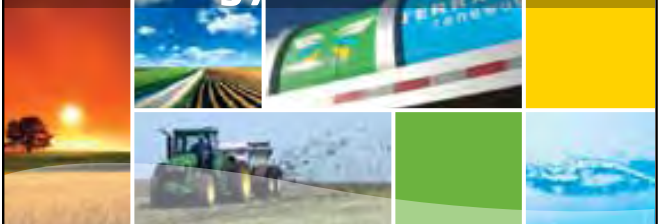
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Committee Sign-up/Volunteer Form

NC AWWA-WEA

3725 National Drive, Suite 217, Raleigh, NC 27612

Phone 919.784.9030 Fax 919.784.9032 www.ncsafewater.org



The active participation of our members is the key to our success. Each member can make a contribution by sharing a small amount of time to help with the Association's work. Please look over the list of committees and choose a few that are of interest to you. To submit completed form mail or fax to the address or fax number provided above.

Name: _____ Employer: _____

Mailing Address: _____ City: _____ State: _____ Zip Code: _____

Phone: _____ Fax: _____ E-mail: _____

Board of Trustees Committees

- Archives & History:** Seeks out, acquires and preserves information pertaining to the activities and achievements of the association and its members.
- Government Affairs:** Serves on behalf of the association as professional representatives of water and wastewater operations on NC.

Outreach Committees

- Outreach:** Addresses the water and wastewater needs of the less fortunate citizens of NC who are not yet benefitting from the expertise of our industry.
- Public Education:** Educates general public regarding water quality issues and the fundamental importance of protecting water resources.
- Water For People:** Helps people in developing countries help themselves.
- Young Professionals:** Encourages and recruits student participation in the association.

Membership Committees

- Communication:** Helps with the preparation of NC Currents quarterly magazine, development of web site and e-mail communication.
- Membership Services:** Attracts and retains new members, establishes a mentoring program, increases involvement of membership, sets diversity examples and becomes the champion of national awards.

Seminars & Workshop Committees

- Seminars & Workshops:** Provides year-round opportunities for water and wastewater professionals to attend seminar to further their professional development.
- Automation:** Develops, recommends, supports and conducts continuing assessments of technologies and techniques to promote overall understanding of the application of process instruments.
- Disaster Preparedness:** Assists local water and sewer utilities in preparation for and response to natural disasters.
- Finance & Management:** Resource regarding finance and management issues facing the water and wastewater industry in NC.

- Industrial:** Provides educational and networking opportunities for industrial environmental representatives.
- Residuals Management/Groundwater:** Provides educational support to the membership in the areas of residuals and biosolids management and groundwater protection.
- Safety:** Develops and implements a safety awareness program for the association; promotes and encourages utilities to conduct their own active and special programs.
- Small Systems:** Investigates issues relevant to small water systems.
- Sustainability:** Develop concepts and best practices for issues that affect sustainability; provide education and training for industry professionals on sustainability topics, and enhance public awareness of successful industry sustainability models.
- Wastewater Collection & Water Distribution Systems:** Supports, educates, and represents the membership regarding issues dealing with the operation, maintenance, planning and management of sanitary sewer systems and distribution systems.
- Water Resources:** Advances technical and institutional practice; influences public policy and advocates the sustainable development, protection, and management of water resources.
- Water Reuse:** Develops, recommends, and conducts programs to promote understanding, acceptance, and development of the reclamation of treated wastewater and water treatment plant waste streams for use.

Schools Committees

- Collection & Distribution Schools:** Plans and carry out all duties required for the annual Collection & Distribution schools.
- Plant Operations & Maintenance:** Promotes a better understanding of the operations and maintenance of water and wastewater treatment plants.
- Professional Wastewater Operators:** Promotes the value and understanding of all aspects of the wastewater treatment industry through information exchange, training, certification, networking and membership support.
- Wastewater Lab Analyst:** Promotes communication between and the education of individual laboratory analyst to ensure the generation of precise and accurate data for the protection and preservation of our water resources.
- Wastewater Operators Schools:** Plans and presents annual review schools presenting the information needed to take and pass the Grades I-IV NC Biological WW Operators license exam. Facilitates development of training materials for certification of operations in charge of Physical/Chemical Treatment Plants as required by state regulations.

NC AWWA-WEA STATE LEVEL ASSOCIATION MEMBERSHIP (SLAM) APPLICATION & RENEWAL FORM

(Valid Until 12/31/11)

NC AWWA-WEA

3725 National Drive, Suite 217, Raleigh, NC 27612

Phone: (919) 784-9030 Fax: (919) 784-9032 Website: www.ncsafewater.org



Instructions To submit an application by fax or mail complete all requested information on this form and mail or fax to the address or fax number provided above. Form and payment must be submitted together. Faxed registrations must be paid by credit card. Applications and renewals may also be submitted online at www.ncsafewater.org.

Please check ONE of the following options.

New Membership (\$30 for 1 year)

Renew Membership (\$30 for 1 year)

NC SLAM #: _____

- All new memberships and renewals are for 1 year (12 months).
- SLAM memberships may not be shared or transferred.
- Renewal reminders will be emailed to the member's email address 1 month before the membership expires.

Personal Information

Full Name: _____

Last 4 Digits of SS #: _____ Year of Birth: _____

**NC AWWA-WEA's event attendance/contact hour tracking program uses the last 4 digits of your SS# in conjunction with your license(s) number(s) as a unique identifier to verify who you are and to communicate to the appropriate agency when reporting your event attendance/contact hour record. We do NOT use your partial SS# for any other purpose. Your partial SS# will NOT be given out to anyone other than the appropriate reporting agency for your license. If you will not allow us to use the last 4 digits of your SS#, please indicate "refused" in the SS# blank. While we will be happy to register you, we cannot guarantee accurate tracking of your attendance at these events.*

How Many Years Have You Worked in the Water/Wastewater Industry?

- Less than 1 1 - 5 6 - 10
 11 - 20 21 - 30 30+

Employer: _____

Which of the Following BEST Describes Your Employer?

- Consulting/Contracting Firm Educational
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 Student Unemployed
 Utility Other _____

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Phone: _____ Fax: _____

Email: _____

In which state do you live?

- North Carolina South Carolina
 Virginia Other _____

License/Certification Numbers

NC Wastewater Certification # (issued by NCWPCSOCC): _____

NC Water Treatment Operator ID # (issued by NCWTFOCB): _____

NC Professional Engineers #: _____

NC AWWA-WEA Voluntary Maintenance Technologist Certification:

Class: _____ Certification #: _____

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Select Receipt/Membership Card Delivery Method

Receipts and Membership Cards can be mailed to 1 person. It is the responsibility of the person receiving the receipt/confirmation to forward as necessary.

- Mail To: Attendee indicated above Person indicated below

Contact Person: _____

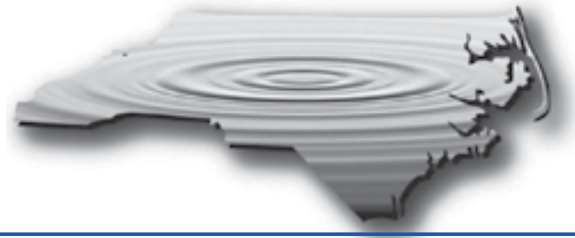
Mailing Address (Home Work): _____

City: _____ State: _____ Zip Code: _____

Email: _____

GET INVOLVED!

WITH THE ORGANIZATION FOR YOU,
YOUR CAREER, & YOUR INTERESTS.



Since 1928, North Carolina has been a Member Association of the **Water Environment Federation** and host to a Section of the **American Water Works Association**, as a joint association for water and wastewater professionals known as the NC AWWA-WEA. This volunteer association, with over 3,000 members, is dedicated to providing water and wastewater education, training and service in an effort to protect public health and the environment.

Over 40 dedicated committees are involved in all aspects of the profession, and a large proactive educational program conducts two conferences, seven schools and forty-plus seminars per year. The active participation of our members is the key to our success. **“Get Involved” to give your water and wastewater expertise a broader scope!**

Vision

The NC AWWA-WEA will be recognized as the leading resource and voice in North Carolina promoting safe water; increasing the knowledge and understanding of safe water; and, preserving, enhancing, and sustaining the water environment.

There Are 3 Ways to Join...

NC American Water Works Association & NC Water Environment Association State Level Association Membership (NC AWWA-WEA SLAM)

Raleigh, NC
919.784.9030
www.ncsafewater.org

To join, complete the form on the reverse side and submit with your membership fee to the address or fax number provided.

American Water Works Association (AWWA)

Denver, CO
800.926.7337
www.awwa.org

Contact this national organization for more information regarding cost and how to join.

Water Environment Federation (WEF)

Alexandria, VA
800.666.0206
www.wef.org

Contact this national organization for more information regarding cost and how to join.

Mission

NC AWWA-WEA is an association of volunteers dedicated to protecting public health, promoting environmental stewardship, providing professional development, and increasing public awareness of the water environment.

Benefits of Membership

Professional Development

- Active committees to match a variety of interest
- Schools providing required certification training
- Seminars, schools and conferences providing the latest information as well as offering continuing education credits
- Leadership opportunities
- Mentoring possibilities

Technical Assistance

- Seminars on the latest regulatory issues
- Forums to address regulatory issues
- Watchdog team to assess new rules

Discounts

- Reduced registration rates at NC AWWA-WEA seminars, schools and conferences
- Reduced costs on purchases from the NC AWWA-WEA bookstore

Joining at the state level (NC AWWA-WEA SLAM) makes you a member of the state association, not a member of either national organization (AWWA and/or WEF); therefore, you will only receive state-level benefits. Joining national AWWA and/or national WEF and having an address in North Carolina automatically makes you a member of the NC AWWA-WEA.

NC AWWA-WEA SLAM members are invited to join NC AWWA-WEA committees. They may register for NC AWWA-WEA events at the member rate and purchase books from the NC AWWA-WEA bookstore at the member rate. SLAM members will be placed on the NC AWWA-WEA member mail and email lists and automatically received registration brochures and email newsletters from NC AWWA-WEA.



NC AWWA-WEA Bookstore Order Form

Form revised April 2011. Valid until December 31, 2011.

NC AWWA-WEA
3725 National Drive, Suite 217, Raleigh, NC 27612
Phone: (919) 784-9030 Fax: (919) 784-9032 Website: www.ncsafewater.org



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CONTACT INFORMATION

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Email: _____

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American Water Works Association (AWWA): _____

Water Environment Federation (WEF): _____

NC State Level Association Membership (NC SLAM): _____

Select Payment Method

Invoices and credit card receipts (if applicable) are sent along with the books to the person placing the order. It is that person's responsibility to forward the credit card receipt to the cardholder if necessary.

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Subtotal of Items Ordered + \$ _____

Order Total \$ _____

Related Class	Book Title	Download Available*	Member Price	Non-Member Price	Quantity	Item Subtotal
Collections I, II, III, & IV	Wastewater Collection Operation & Maintenance - Vol. 1 (Sacramento Manual)		\$60	\$75	X =	
	Wastewater Collection Operation & Maintenance - Vol. 2 (Sacramento Manual)		\$60	\$75	X =	
	NC Collection System Operator's Needs to Know*	Yes	\$15	\$30	X =	
Physical/Chemical	Industrial Waste Treatment, Vol. 1 (Sacramento Manual)		\$60	\$75	X =	
	Industrial Waste Treatment, Vol. 2 (Sacramento Manual)**		\$60	\$75	X =	
	Pretreatment Facility Inspection (Sacramento Manual)		\$60	\$75	X =	
Distribution C, B, & A	Treatment of Metal Wastestreams (Sacramento Manual)		\$40	\$55	X =	
	Physical/Chemical Wastewater Operator's Needs To Know*	Yes	\$15	\$30	X =	
	Water Transmission & Distribution Textbook – AWWA		\$83	\$98	X =	
Distribution D	Water Transmission & Distribution Workbook – AWWA		\$32	\$47	X =	
	NC Distribution Needs To Know for C, B, & A*	Yes	\$15	\$30	X =	
	Water Distribution Operator Training Handbook – AWWA		\$51	\$66	X =	
Meter Technician	NC D-Distribution Needs To Know Manual*	Yes	\$15	\$30	X =	
	Water Meter - Selection, Installation, Testing, & Maintenance - AWWA M6 Manual		\$64	\$79	X =	
	NC Water Meter Needs To Know Manual*	Yes	\$5	\$20	X =	
Biological Wastewater I	Small Wastewater System Operation & Maintenance - Vol. 1 (Sacramento Manual)		\$60	\$75	X =	
	Small Wastewater System Operation & Maintenance - Vol. 2 (Sacramento Manual)		\$60	\$75	X =	
	NC Biological Wastewater Treatment System Operators Training Course Standards - Grades I & II* (Also known as the Grade I & II Needs To Know)	Yes	\$15	\$30	X =	
Biological Wastewater II, III, & IV	Operation of Wastewater Treatment Plants - Vol. 1 (Sacramento Manual)		\$60	\$75	X =	
	Operation of Wastewater Treatment Plants - Vol. 2 (Sacramento Manual)**		\$60	\$75	X =	
	Advanced Waste Treatment (Sacramento Manual)		\$60	\$75	X =	
Maintenance Technologist	NC Biological Wastewater Treatment System Operators Training Course Standards - Grades III & IV* (Also known as the Grade III & IV Needs To Know)	Yes	\$15	\$30	X =	
	Pumps and Pumping		\$60	\$75	X =	
	Electrical Fundamentals for Water and Wastewater		\$70	\$85	X =	
All	Audel Mechanical Trades Pocket Manual, 4 th Edition		\$15	\$30	X =	
	Water Treatment Plant Operation, Vol. 2**		\$54	\$69	X =	
	Industrial Maintenance, 3 rd Edition		\$80	\$95	X =	
All	Maintenance Technologist Class I – Needs to Know Manual*	Yes	\$15	\$30	X =	
	Maintenance Technologist Class II – Needs to Know Manual*	Yes	\$15	\$30	X =	
	Maintenance Technologist Class III – Needs to Know Manual*	Yes	\$15	\$30	X =	
	Math Manual*	Yes	\$15	\$30	X =	

Please see note below about additional items marked with ***.

* Denotes items that can be downloaded for free from www.ncsafewater.org. Go to the "Bookstore" page and find the correct link under the corresponding class.

**One of these items is recommended for individuals taking the Maintenance Technologist course.

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CCI Spectrum, Inc.	107	800-284-2030	www.spectrashield.com
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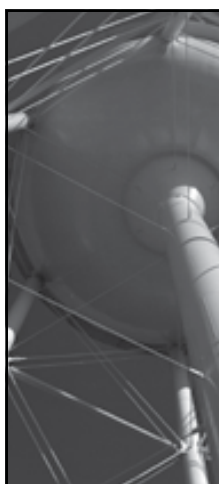
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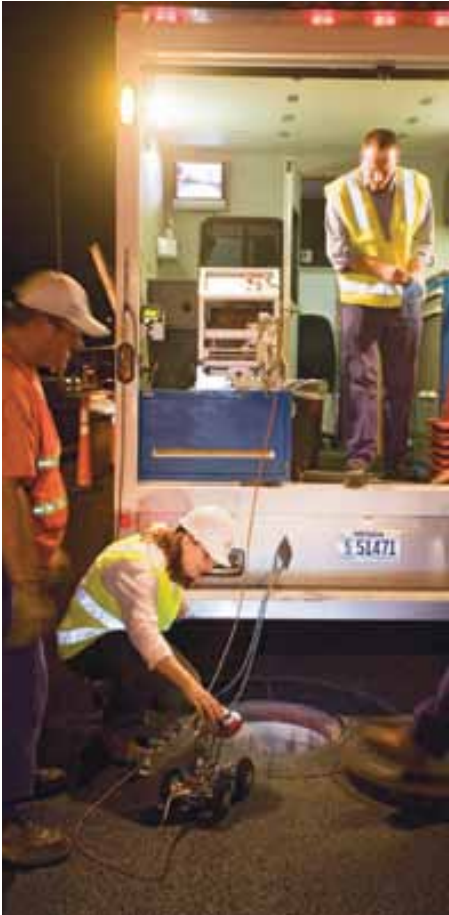
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