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I am not sure why, but lately I have been thinking a lot about the value of membership in our Association. I know there have been other articles written on the subject of the importance of membership, and they may share some areas of similarity, but I want to give you my own personal frame of reference. Just like the disclaimer that is often added to editorials, the views expressed here are strictly those of the author.

I have historically found a variety of views about the value of membership, some extremely positive and supportive, and some bordering on absolute opposition. I have experienced situations where activity was fully supported, and I have had colleagues tapping me on the shoulder and seeking to help me become active. I have benefitted from having mentors - people to help guide me in Association activity. More than once, I have also been in situations where active membership was not highly valued, and I found myself having to justify the value of active participation. Through my unsupported situations, I have developed a pretty robust list of added values that you can find through activity in our Association.

What I really want to focus on are the positives of active membership. I hope you will see the same thing I have seen, that the positives far outweigh any perceived negatives, and that active participation in the Association carries so many benefits at any time, but especially with the economic climate we face now.

Opportunities to build strong relationships with peers and clients
Above all else, business in the water industry is built on relationships and trust, and next to actually working together on projects, volunteering together in Association activities is the best way to get that experience and build relationships and trust.

Providing a wide variety of educational opportunities
Education is at the core of our Association’s mission and an area where we excel. Education, training and learning can take many forms and the Association provides opportunities in virtually all of them. A few examples are:

- attending technical seminars, schools and conferences;
- presenting or teaching at seminars, schools or conferences;

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Message from the Chair

Helping ensure that the water industry is sustainable well into the future

There are so many ways of giving back to, and supporting the water industry and thus helping everyone working in the industry, now and into the future. A few of these include:

- the Public Education Committee and its work to promote our industry and the value of safe water both internally and externally;
- The Students and Young Professionals Committee with its support of Student Chapters at UNC Charlotte and NC State University;
- The Endowment Committee and its many donors, doing its work to fund scholarships to educate and support the next generation of water industry leaders;
- The Water For People and NC Outreach Committees, both of which provide volunteer leadership that helps provide safe and sustainable water for people in North Carolina and overseas in Bolivia, South America.
- The Communication Committee, with its work on the NC Currents magazine, offering a forum for promoting our mission to educate and train; and
- many, many other activities that ensure the sustainability of the water industry overall.

Providing opportunities for consultants and manufacturer’s representatives to display new ideas and project successes

While maybe not as altruistic as some of the previous areas of value, the Association provides an unmatched forum for consultants and manufacturer’s representatives (and utility staff too) to display their latest technological innovations, ideas and strategies aimed at addressing the most challenging issues faced by our industry.

As I noted earlier in the article, I found myself in situations where I had to come up with areas where Association activity provided real value. How about you? Did I miss one that you have observed? I would be interested to hear about it. Please let me know at john.mclaughlin@ghd.com.

The next time you hear people question the value of Association activity, you should be well equipped to convince them otherwise.

As always, thank you all, for all you do with the Association.

“There are so many ways of giving back to, and supporting the water industry.”
Not until a 66-inch concrete water main bursts in the middle of an intersection in below-freezing temperatures, two days before Christmas, trapping nine people in a torrent of water and necessitating rescue by helicopter, boats and fire trucks and cutting off water to thousands over Christmas, does the public discover the critical importance of maintaining infrastructure.


Of course, the real story is not just about that particular break at Christmas 2008, it is about the 1,709 breaks reported by the Washington Suburban Sanitary Commission (WSSC) for that year in its 5,500 miles of water mains. It is about the fact that of those 5,500 miles, Steve Maxwell and Scott Yates report at least one of every four miles is more than 50-years-old. It is about the fact that WSSC has a budget that is adequate for replacement of about 25 miles of that pipe each year – which would take the WSSC 220 years to replace. That is the real story – that our national infrastructure is old, deteriorating, and that we are not funding or planning to replace it at the rate that is now urgently needed to maintain the quality of life, the jobs, the health and environmental standards to which we have become accustomed.

The American Water Works Association (AWWA) and the Water Environment Federation (WEF) have been cataloging the growing (now $1 trillion) need for replacement of aging infrastructure – and preaching it in louder and more compelling tones for more than a decade. AWWA’s Dawn of the Replacement Era looked at 20 water systems, and developed a graph called “The Nessie Curve” (apparently because it looks like the Loch Ness Monster), which showed the enormous investment needs in each of the systems that were part of the original analysis. The new AWWA report, Buried No Longer expands the analysis from the original 20 water systems to the entire US.

And of course, we know all of this, because we live the reality of it every day of our working lives. As water professionals, you know the age of the pipes you have laid, the plants you have designed, built, and/or operate and maintain. You know the shackles that the budget limits put on your ability to do what is necessary, (never-mind what would be ideal). You also know the phenomenal effort, the ingenuity, the skill and resourcefulness that water and wastewater professionals bring to the challenge daily. You live the pleasure and pain of the work.

Why is it so difficult to get this message out to the consumers of the services we provide? Why, after more than a decade of studying, reporting and talking about the growing need to begin to tackle the aging of our infrastructure – and after massive and very public infrastructure collapses like the main break in Washington DC at Christmas 2008 – is there not a greater awareness by the public?

The truth is that we already have all this knowledge and awareness of the risks and costs, the needs and demands of aging infrastructure. It is the public who needs to be the audience for it. Somehow, we have to find a way to get the attention of the public – ‘the owners’ – of all this infrastructure. We have to find a way to awaken them from their sleep of ignorance or apathy, find a way to engage them in the solution.

I believe the answer lies in relentless public outreach, investment in public education, the harnessing of technology to ensure that we are providing access to information, commanding the tools and techniques of public engagement and marketing to get our story heard and understood in order to galvanize change in our fellow citizens.

Because the truth is that the work of water treatment is more like a calling than a profession, something you believe in to the core of your being. You will continue to do the great and good work that you have always done: planning, saving, improvising, going the extra mile to get an extra day,
Click Here to return to Table of Contents

and back to the territory of the barbarians. NC AWWA-WEA has joined with NCWOA and NCRWA to put together a web site that is intended to engage the North Carolina public in a public education program about our water, the professionals who ensure its quality and protect public health, and the place that infrastructure plays in accomplishing that work. Please take a few minutes and go to that site: http://www.mywatermatters.org.

Meanwhile, thank you so much for the part you play every day in maintaining the empire of civilization.

NC AWWA-WEA has joined with NCWOA and NCRWA to put together a web site that is intended to engage the North Carolina public in a public education program about our water, the professionals who ensure its quality and protect public health, and the place that infrastructure plays in accomplishing that work. Please take a few minutes and go to that site: http://www.mywatermatters.org.

### Training Report

**Catrice Jones, Educational Events Manager**

As the heat of summer has steadily increased, so has the momentum of our training programs. In June, our Seminars and Workshops Committee focused on sustainability with It’s Good To Be Green: Project Funding and Sustainability in a Down Economy held at the City of Raleigh’s DE Benton WTP. Then in July it turned its attention to state regulations with the Drinking Water Rules & Regulations Update held at NCSU McKimmon Center.

Not to be outdone by our Seminars and Workshops Committee, our school committees have been hard at work to continue providing quality training to certify operators in the areas of water, wastewater, and maintenance. In July and August, in Morganton, they put on the Western Biological Wastewater Operators School (Wastewater Schools Committee), Western Maintenance Technologist School (Plant Operations and Maintenance Committee), and Western Collection/Distribution School (Collection/Distribution Schools Committee).

To raise the bar even further, our e-learning taskforce partnered with the Seminars and Workshops Committee and Risk Management Committees as the Association embarks on its journey to provide more training options for our members and other industry professionals. As a result, the first webinar, ‘An Introduction to NC Water WARN,’ was offered to the Association in August.

As fall rolls in, our committees continue to be hard at work preparing even better training events and webinars. Be sure to check our website or bimonthly e-news for information and updates on our course offerings across the state and online.

### Training Report

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
<th>LOCATION</th>
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<tr>
<td>Jan 26-27, 2012</td>
<td>AWWA CSR Training Course 3</td>
<td>Carrboro, NC</td>
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<td>Seminars &amp; Workshops</td>
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<td>Feb 23-24, 2012</td>
<td>AWWA CSR Training Course 1</td>
<td>Durham, NC</td>
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<td>March 6, 2012</td>
<td>Water Reuse: Drivers and Impediments Seminar</td>
<td>Elon, NC</td>
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<td>March 12-16, 2012</td>
<td>Eastern Collection/Distribution School</td>
<td>Raleigh, NC</td>
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<td>March 21, 2012</td>
<td>Legislative and Regulatory Topics relating to Water/Wastewater – What’s on the Horizon</td>
<td>Raleigh, NC</td>
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<td>March 22-23, 2012</td>
<td>AWWA CSR Training Course 2</td>
<td>Durham, NC</td>
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<td>April 12-13, 2012</td>
<td>AWWA CSR Training Course 3</td>
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<td>April 15-17, 2012</td>
<td>NC AWWA-WEA Spring Conference</td>
<td>Wilmington, NC</td>
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<td>Spring Conference</td>
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<td>April 30-May 4, 2012</td>
<td>Eastern Biological Wastewater Operators School</td>
<td>Raleigh, NC</td>
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<td>May 1-4, 2012</td>
<td>Physical/Chemical Wastewater School</td>
<td>Raleigh, NC</td>
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<td>May 9, 2012</td>
<td>Finance &amp; Management Seminar</td>
<td>Fayetteville, NC</td>
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<td>June 7, 2012</td>
<td>It’s Good to be Green: Project Funding and Sustainability in a Down Economy Seminar</td>
<td>Raleigh NC</td>
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<td>July 16-20, 2012</td>
<td>Western Biological Wastewater Operators School</td>
<td>Morganton, NC</td>
<td>132</td>
<td>Wastewater Schools Committee</td>
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<tr>
<td>July 16-19, 2012</td>
<td>Western Maintenance Technologist School &amp; Exam – Grades 1, 2, &amp; 3</td>
<td>Morganton, NC</td>
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<td>Plant Operations &amp; Maintenance Committee</td>
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<td>July 24, 2012</td>
<td>Drinking Water Rules &amp; Regulations</td>
<td>Raleigh, NC</td>
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<td>Seminars &amp; Workshops</td>
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<td>Aug 6-10, 2012</td>
<td>Western Collection/Distribution School</td>
<td>Morganton, NC</td>
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<td>Aug 9, 2012</td>
<td>Webinar: Introduction to NC Water WARN</td>
<td>Online</td>
<td>17</td>
<td>Risk Management Committee</td>
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</tbody>
</table>
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(757) 431-2966 | www.obg.com
March 16, 2012
Chaired by John McLaughlin in Raleigh, NC.

The following actions were taken during this meeting:

1. The Audit for FY 2011 as presented by Langdon and Company, CPA, was accepted.
2. The Board approved the Audit with the following highlights:
   • Capital equipment acquired during the fiscal year was the new VOIP phone system.
   • The endowment grew, with a number of new named funds.
   • The reserve fund is at 50% of the annual operating budget at $569,940.
   • Registration income increased by $37,204 for the year, over FY 2010.
   • Membership dues income increased by $14,671 as a result of the $5 dues increase for WEF and SLAM member categories.
   • Revenue was up by 6% as a result of endowment contributions as well as registration and member dues income increases.
   • Assets increased by $40,929, but when endowment income is backed out, net assets declined by $15,015 and reserved declined by $7,221 when compared with FY 2010.
3. The Board accepted the 990 Tax Reports for NC WEA and NC Section AWWA.
4. An update was received on Public Education Committee efforts to promote NC AWWA-WEA as the host for the Stockholm Junior Water Prize competition in 2014. The Board has committed to raise the anticipated $20,000 – $25,000 in funds necessary to support this event if NC AWWA-WEA is selected as the Member Association host.
5. The Minutes of the January 25, 2012 Board of Trustees meeting were approved.
6. The Board accepted the Treasurer’s report for January and February 2012 as follows:
   • Total assets as of February 29, 2012 of $921,305 with $899,141 in checking/savings, of which $160,935 is endowment funds, $3,497 are temporarily restricted funds in the Outreach Account, and $96.80 are temporarily restricted funds in the Water For People (WFP) Paypal Account.
   • The balance of unrestricted net assets (checking minus WFP Paypal, Outreach and Endowment) is $734,612.
7. The committee reports submitted to and compiled by Secretary Crystal Broadbent were accepted.
8. The Board received the Water Environment Federation’s (WEF’s) new Mission, Vision, Guiding Principles and Critical Objectives as presented by WEF Delegates Angela Lee and Jeff Payne.
9. The Board received the AWWA Director’s report that AWWA has released the report Buried No Longer identifying $1 trillion in infrastructure needs for water and wastewater.
10. The Board received the Executive Director’s report, including the spring conference registration update and the update on the Constitution and Bylaws (C&BL) Committee activities to gain NC AWWA membership support for the establishment of Section dues at the 5% level.
11. Chair McLaughlin appointed Jack Moyer as the Chair of the new Risk Management Committee, which comprises the former Safety and Disaster Preparedness Committees.
12. The Board approved a revision to the Council structure, eliminating the Internal Affairs Council, and realigning the Archives and History, Constitution and Bylaws and Endowment Committees with the External Affairs Council; Sponsorship is now aligned with the Annual Conferences Council.
13. The Board assigned reevaluation of the business model to the Executive Committee as part of the budget evaluation process.
14. Awarding the contract for the exhibitor registration to e-Show was approved.
15. The Board approved the appointment of John Gibson as Biological IV to the Wastewater Board of Education and Examiners (WWBOEE), Medina Ward for the Other Applicable Certification position, and Dana Hill as Wastewater (WW) System with a population less than 10,000.
16. The Board approved a budget amendment, transferring $2000 for Stockholm Junior Water Prize winner travel from the Young Professionals (YP) budget to the Public Education Budget.
17. Final language for the Student Registration Policy was approved.
18. The Board approved transfer of reserve funds in the form of CD’s from Sun Trust to Truliant Credit Union in the amount of $14,048 for NC Section AWWA and $183,952 for NC WEA, which satisfies repayment to NC WEA of the sum of $83,952 owing at year end.
19. Establishment of the Rivers & Associates named endowment fund was approved.
20. The Board approved establishment of the Lars Balck named endowment fund.

Remaining meetings of the Board of Trustees in 2012 are as follows:
• May 15, at Greensboro Kitchen Operations Center,
• July 12, at Swann Water Treatment Plant, 2800 River Ridge Road, Pfafftown,
• September 20, at the Marriott City Center, 500 Fayetteville Street, Raleigh, and
• November 11 and 14, at the Marriott City Center, 500 Fayetteville Street, Raleigh.
Summary of the NC AWWA-WEA Board of Trustees Meeting

May 17th, 2012
Chaired by John McLaughlin at Greensboro, NC.

The following actions were taken during this meeting:

1. The Board accepted the Treasurer’s report for March and April reflecting that total assets as of April 30, 2010 were $945,282.70, with $918,821.15 in checking/savings, of which $170,935.32 is endowment funds, $3,497.26 are temporarily restricted funds in the Outreach Account, and $96.80 is temporarily restricted funds in the Water For People (WFP) Paypal Account. The balance of unrestricted net assets (checking minus WFP Paypal, Outreach and Endowment) is $744,291.77.

2. The committee reports submitted to and compiled by Secretary Crystal Broadbent were accepted.

3. Executive Director Roberts reported on the Constitution and Bylaw (C&BL) Section Dues Ballot, noting that section dues were approved by the NC Section AWWA Membership. A total of 416 ballots were returned, with 332 votes supporting the section assessment. The membership at the outset of balloting was 1,478. The results therefore verify that ballots were returned by 28% of the section’s membership and that 80% of those voting approved the assessment. A letter of confirmation has been sent to the AWWA Executive.

4. The Board accepted the appointment by Chair McLaughlin of Maggie Macomber to a one-year term on the Nominating Committee to fill a position created when Past Chair Reuss was appointed to the vacant Chair’s position, and of Bob Fritts and Ray Cox to two-year positions.

5. The Executive Committee reported that, with reduction of a vacant full-time position to a half-time position, total staff has been reduced to 3.5 full time equivalents (FTEs).

6. The reduction in staff is predicated on development of a volunteer corps to handle on-site seminar and workshop registration and is subject to review for a period up to six months covering the Annual Conference, to evaluate the success of the volunteer corps for seminar and workshop on-site support and the impact of change on staff workloads.

7. The Board directed development of budget information regarding a request from Mike Richardson, that NC AWWA-WEA provide administrative support for further review in July.

8. Continued work by SONAR on an evaluation matrix through September was approved.

9. The Board approved an extension of the Spring Conference through 2015 with a revised focus to be Operations, and directed the Executive Director to negotiate contracts for 2014 and 2015 in Wilmington.

10. The Board committed to participation in Environmental Protection Agency (EPA) funded training, in the event that the AWWA/RCAP application for EPA grant funds is successful.

11. Changes to the Endowment Policy were approved as follows:
   - defining the corpus as cash donations received in hand;
   - creating a definition of a ‘normal year’;
   - specifying that calculations for amounts to be disbursed will be based on the prior year – for example, the 2013 disbursement will be based on the year-end position of the scholarship fund for 2011;
   - allowing for the aggregation of funds with named donors choosing to aggregate alone, to aggregate with others, to add funds to the corpus, direct some of the additional donation to the corpus and/or to the disbursement amount, and, if there are no applications or none meet the criteria, to choose to invest the disbursement amount from their funds as above; and
   - continuing to require that the original pledge amount must be made in full.

12. The Board approved a selection process for endowment awards as follows:
   - The Selection Committee must have a majority of non-members. Nine members are proposed as a total number for the committee, with five of those being non-members of the Association.
   - A group (possibly the Public Education Committee) is proposed to receive applications and ensure that criteria have been met.
   - Applications that do meet the criteria will then be turned over to the Selection Committee, in bundles, for each specific award.
   - The Selection Committee will advise staff of the names of those selected and staff will then cut checks to make payment to the winners in late June each year, or in early July.
   - All applicants will be notified of the decision of the Selection Committee by the Endowment Chair.

13. The Board approved moving two CD’s from Sun Trust to Truliant Credit Union, which has the best interest rate.

14. The Board authorized the North Carolina State University (NCSU) Student Chapter to mount a fundraising campaign to generate an additional $3,000 to add to the $2,000 budgeted for travel of students to WEFTEC to participate in the student design competition. It was the further consensus of the Board that, if, in the future, there are multiple student chapters who want to participate in the design competition, a state-wide competition will be held, and the winning team of that competition will be funded to participate.

Remaining meetings of the Board of Trustees in 2012 are as follows:
- July 12 at Swann Water Treatment Plant, 2800 River Ridge Road, Pfafftown,
- September 20 at the Marriott City Center, 500 Fayetteville Street, Raleigh, and
- November 11 and 14, at the Marriott City Center, 500 Fayetteville Street, Raleigh.
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## NC AWWA-WEA Committee Chairs

### Annual Conferences Council

<table>
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<tr>
<td>Exhibits</td>
<td>Jim Anderson (704) 323-7031</td>
<td>Spring Conference Program</td>
<td>Lynda Elliott (704) 432-2953</td>
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<tr>
<td>Local Arrangements</td>
<td>Adrienne Coombes (919) 233-5261</td>
<td>Conference Alternatives Task Force</td>
<td>Tim Lowder (704) 334-5348</td>
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<td>Program</td>
<td>Larry Mitchell (919) 854-6235</td>
<td>Sponsorship</td>
<td>Dave Zimmer (704) 3424546</td>
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<td>Spring Conference</td>
<td>Mary Knoosby (704) 338-6857</td>
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### Awards Council

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<td>5-S</td>
<td>Kevin Mosteller (704) 338-6800</td>
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<td>Pam Moss (970) 227-1498</td>
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<td>Chris Parisher (919) 677-0830</td>
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<tr>
<td>Bedell Award</td>
<td>Howard Kimbrell (919) 280-4350</td>
<td>Kenneth J. Miller WFP Award</td>
<td>Ilke McAliley (704) 338-6794</td>
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<tr>
<td>Burke/Courman Awards (Safety)</td>
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<td>Lab Analyst Award</td>
<td>Debra Collins (252) 399-2494</td>
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<tr>
<td>Ebert Award (Bd of Ed &amp; Ex)</td>
<td>Thurman Green (919) 537-4224</td>
<td>Platt/Mallard Award (Membership)</td>
<td>Laurin Kennedy (704) 342-4546</td>
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<tr>
<td>Educator of the Year Award</td>
<td>Bob Berndt (919) 833-7152</td>
<td>Safe Drinking Water Act Excellence Award</td>
<td>Mark Wessel (919) 787-5670</td>
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### Board of Trustees Committees

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<tr>
<td>Executive</td>
<td>John McLaughlin (704) 996-6895</td>
<td>Outreach</td>
<td>Chris Windley (919) 233-8091</td>
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<tr>
<td>Nominating/Canvass</td>
<td>Brent Reuss (704) 510-8423</td>
<td>Public Education</td>
<td>George Simon, Jr. (704) 841-2588</td>
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<td>Water For People</td>
<td>Ilke McAliley (704) 338-6794</td>
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<td>Young Professionals</td>
<td>Melinda King (336) 412-6314</td>
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### External Affairs Council

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<tr>
<td>Communication</td>
<td>Tom Bach (704) 786-1783</td>
<td>Risk Management</td>
<td>Jack Moyer (919) 461-1472</td>
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<tr>
<td>Constitution and Bylaws</td>
<td>Chuck Willis (704) 338-4668</td>
<td>Seminars and Workshops (M.W.)</td>
<td>Betsy Drake (919) 481-5093</td>
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<tr>
<td>Endowment</td>
<td>Les Hall (919) 614-2285</td>
<td>Small Systems</td>
<td>Jim Adams (828) 2964580</td>
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<td>Membership Services</td>
<td>Laurin Kennedy (704) 342-4546</td>
<td>Sustainability (P.J.)</td>
<td>Randy Fouke (919) 461-1466</td>
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<td>Water Resources (P.J.)</td>
<td>Adam Sharpe (919) 875-4311</td>
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<td>Water Reuse (B.T.)</td>
<td>Patricia Drummey (919) 833-7152</td>
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<td>WW Collection and Water Distribution (B.T.)</td>
<td>Bart Helger</td>
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<td>Automation (P.J.)</td>
<td>Don Dickinson (919) 633-0147</td>
<td>Water Board of Education and Examiners (B.T.)</td>
<td>Thurman Green (919) 537-4224</td>
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<td>Finance and Management (B.T.)</td>
<td>Elaine Vastis (704) 373-1199</td>
<td>WW Board of Education and Examiners (B.T.)</td>
<td>Ken Vogt (910) 332-6586</td>
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<td>Jennifer Bell (919) 875-4311</td>
<td>WW Treatment Operators Schools (T.H.)</td>
<td>John Dodson (919) 560-4384</td>
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<td>Howard Kimbrell (919) 280-4350</td>
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<td>IWI Confluence Conference (B.T.)</td>
<td>Chad Ham (910) 223-4702</td>
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<td>Residuals Management/Groundwater (B.T.)</td>
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### Seminars Committees

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### School Committees

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<td>Collection/Distribution Schools (A.B.)</td>
<td>Geri Brown (704) 336-2858</td>
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<tr>
<td>Plant Operation and Maintenance (M.W.)</td>
<td>Bob Fritts (704) 363-8241</td>
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<tr>
<td>Professional Wastewater Operators (T.H.)</td>
<td>T.L. Lynch (919) 662-5700</td>
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<tr>
<td>Wastewater Lab Analyst (T.H.)</td>
<td>Glenn McGirt (336) 222-5133</td>
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Committee Reports

The following reports are based on information that was current as of July 12, 2012. For more up-to-date information refer to each committee’s web page on www.ncsafewater.org or contact the committee’s 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 available at www.ncsafewater.org or contact the committee’s chair. 

External Affairs Council

Communication Committee

Chair: Tom Bach, WSACC
A Communication Committee face-to-face meeting was held in Raleigh on July 10, 2012 and several agenda items were discussed. A summary of these items is as follows: NC Currents deadlines have been established through 2013, and tentative themes and theme leaders are planned through the summer 2014 issue. The editorial process was discussed, including using editing features of SharePoint and dividing the proof review responsibilities among committee members. Distribution of NC Currents to NC state legislators was discussed. Based on the guidelines received from legal counsel, we can distribute one issue a year to all NC state legislators. Distribution will start with the winter 2013 issue, and we will investigate the legality of adding NC state legislators to the standard NC Currents mailing list to receive four issues annually. The Electronic Subcommittee is encouraged to continually review and present corrections and updates for www.ncsafewater.org.

Endowment Committee

Chair: Les Hall
The NC Safewater Endowment Program has a total of $344,344 in pledges, including pledges for a new named fund. The committee began selling raffle tickets for Bob Pittman’s painting. One hundred tickets will be sold for $50.00 each. The raffle is publicized in the Annual Conference registration brochure. The committee also plans to raffle about 10 items at the Annual Conference with raffle tickets costing substantially less than the $50.00 painting raffle tickets. Both raffle drawings will take place during the Monday night Chair’s Reception.

The committee has enough information to begin conversations with the Public Education Committee to finalize the details of publicizing, selecting awardees, and administering the process of awarding scholarships and grants funded by the NC Safewater Endowment Program. Plans are to present details to the Board of Trustees for the September Board meeting.

Outreach Committee

Chair: Chris Windley, McKim & Creed
The committee has received commitments from volunteers to help North Carolina Rural Communities Assistance Project (NCRCAP) on a Preliminary Engineering Report (PER) and will hold a kickoff meeting soon. The meeting will also be used to discuss other potential activities working with NCRCAP on projects.

Public Education Committee

Chair: George Simon, McKim & Creed
Science Fair Recap: This year, Public Education Committee (PEC) volunteers awarded over 40 awards at regional and state science fairs. Many thanks to Jason Manning, Scott Carpenter, Diana Rasash, Maggie Hennessey, Courtney Licatta, Simon Lobdell, Laine Roberts, Michael Gendy, Al Nelson, Jean Creech, Pete D’Adamo, Tina Whitfield, and John Hahn.

Carol Bond Scholarship Update: The Carol Bond Scholarship Task Force is exploring new ways of informing college students about the availability of the Carol Bond Scholarships. We are soliciting volunteers to act as ‘school liaisons’ in
North Carolina. Ideally, these volunteers would be alumni of, and/or live close by a university or community college, or they might just be passionate about promoting our scholarship program. If you are interested in the possibility of volunteering for this effort, please contact Don Francisco at don_francisco@unc.edu or (919) 933-0541.

Public Education Project: We continue to work with the North Carolina Rural Water Association (NCRWA) and the North Carolina Waterworks Operators Association (NCWOA) to develop a joint public education campaign. A new website and public service announcement (PSA) should be available by the time of this publication. Stay tuned, as there will be more opportunities for involvement and the development of educational materials!

Water For People Committee
Chair: Ilke McAliley, HDR Engineering, Inc.
5k update: There is an approximate $4,000 net gain from the 2012 event with the medic expense still outstanding. The 2013 event may need to be moved to an alternative location in Charlotte or Raleigh since there is a bid out right now for a sewer line on the McAlpine 5k course.

Climb For Water: Over $8,900 has been raised, with $8,000 of that donated through the North Carolina Water For People (NC WFP) chapter. The fundraising goal this year is $10,000. There are 21 climbers with Paul Judge and Matt Wilson representing the NC WFP committee. Jake Norton will also climb with the group. A happy hour fundraising event took place in August in Charlotte and Raleigh.

Geocache: Scheduled to take place in the fall.

Golf tournament: Scheduled for October 21 in Thomasville. The rain date is October 26. Online registration is available on the Association website. An email will be sent out with the flier and sign-up form. NC WFP Committee members will contact previous sponsors. Tournament volunteers will be identified at the next meeting.
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Committee Reports

Technical & Educational Council

Seminars & Workshops Committee
Chair: Betsy Drake, Town of Cary
The Board of Trustees has approved a written policy for student registrations. Progress for 2012 seminars has been discussed and work continues to ensure each seminar is on track. Planning for 2013 seminars will commence in August. This will be the second year that outside committees are required to submit proposals to hold a seminar. The 2013 proposal forms have been distributed to the committee chairs and are due in August. The importance of meeting Training Catalog deadlines was discussed, not only for advertising purposes, but also to ensure contact hour approval can be obtained and publicized. A seminar proposed by a tank manufacturer was discussed and the decision was made not to present the seminar since it could be viewed as NC AWWA-WEA endorsing that manufacturer. The agenda will be passed along to planners of the Collection & Distribution Seminar as a resource for topic ideas and possibly speakers. A new procedure is in process that will involve volunteers handling the on-site registration/coordination tasks at each seminar. In the past, this has been handled by a member of the Association staff. Staff is preparing a procedure document that will be reviewed by the Board. The Going Green Seminar in June was a successful test case for the new process.

Risk Management Committee
Chair: Jack Moyer, URS Corporation
The Risk Management Committee was formed in early 2012 by the merger of the former Safety and Disaster Preparedness Committees. The purpose of the new committee is to help Association members prepare for the full range of risks with which they may need to deal, including safety challenges, disasters, emergencies, business continuity, financial and legal risks, etc.

The primary methods used by the committee to help Association members prepare include:

• staying abreast of water sector trends relevant to risk management and

Finance & Management Committee
Chair: Elaine Vastis Conti, Raftelis Financial Consultants
The Rates 101 Seminar held May 9 in Fayetteville was a success, with 25-30 attendees and six presenters. The majority of attendees indicated that topic and not location was their primary reason for attending. Suggestions for future seminar topics included deposit and collection procedures and wastewater pretreatment/biosolids. The committee has historically put on two workshops per year, however, NC AWWA-WEA has reduced the overall number of annual seminars. The Finance & Management Committee will strive to hold one workshop and one webinar annually. During a discussion of potential workshop topics, billing and collections systems received the most interest, and collection and deposit issues was proposed as a webinar topic, since it was suggested by May seminar attendees and has been heavily discussed on the ListServe.

Industrial Committee
Chair: Howard Kimbrell, Highfill Infrastructure Engineering
The Industrial Committee is back. According to Chair Howard Kimbrell and Vice Chair Katie Jones, after several years of near inactivity, the committee has been re-energized. We have re-instituted some of the committee activities that made it successful once before but had been dropped over the years. Those activities included plant
Committee Reports

Water Resources Committee
Chair: Adam Sharpe, CH2M Hill

At the June 15 meeting, Jamie Robinson made a presentation on the technical aspects of the State’s Ecological Flows Science Advisory Board’s (SAB) work to date. The SAB presentation slides and meeting minutes are available at www.ncwater.org/Data_and_Modeling/eflows/.

At the same meeting, Erin Wynia facilitated a discussion on the development of a bullet list of legislative/regulatory issues and barriers related to water supply in NC. This list is being developed based on the Water Resources Committee’s (WRC’s) last meeting with John Goodman from the NC Chamber of Commerce, and the intention is to concisely list the issues NC AWWA-WEA and the Water Resources Committee would like to see addressed as a comprehensive solution to water supply issues. The list will be sent to the NC Chamber to be included as part of the Chamber’s comprehensive water resources package presented to the General Assembly. Due to timing, the initial list will focus on issues currently being focused on by the Chamber, as documented in the WRC’s April meeting minutes.

Wastewater Board of Education & Examiners Committee
Chair: Ken Vogt, CFPUA

At the request of the Technical Assistance and Certification Unit (TACU), the Biological, Collections and Physical/Chemical sub-committees are reviewing and developing detailed specific need-to-know (NTK) manuals. The Collection System NTK is 90% complete. The Biological and Physical/Chemical NTKs are under development with a general outline expected at the August meeting, and review procedures being discussed.

Due to a scarcity of nominations for the 2011 Collection Systems Operator of the Year Award, we are considering different ways of communicating this award to the wastewater community. The Awards Council is considering the same subject in relation to all Association awards. Ken Steins will continue to represent the Wastewater Board of Education & Examiners (WWBOEE) on the awards council and report back on any progress.

The WWBOEE has concerns and is investigating the same plant level/same operator’s grade regulation and may prepare and present its recommendation...
Committee Reports

This year, the Schools Committee was again responsible for developing the Advanced Topics Seminar. The school returned to its one-day format with multiple topics being covered.

The committee is studying how to provide these schools in the future in order to take advantage of changing technology and to meet the economic and educational needs of those being served. Your input would be greatly appreciated.

I would like to express my thanks to the new members who signed up for the Schools Committee this year and extend my offer to any of you who would also like to help out with this committee’s work.

Wastewater Schools Committee
Chair: John Dodson, City of Durham

The Wastewater Treatment Plant Operators Schools Committee depends upon volunteers to plan and deliver several schools and training events every year.

This year, the committee has organized and conducted two five-day schools (one in Raleigh and one in Morganton) for biological wastewater treatment plant operators grades I through IV. Each of the schools requires 45 to 50 instructors to present the 70 topics that are covered at each school. Several of the instructors teach more than one class. In addition to the instructors, monitors are needed to cover the 38 sessions of classes at each school. Monitors help instructors and assist with the logistics of each school. Several of the monitors also cover more than one session of classes.

The Schools Committee is also responsible for the physical/chemical operators school for grades I and II. This school covers 28 topics with multiple instructors (again several instructors teach more than one class and several monitors cover more than one session.)

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While working with McKim & Creed, (William) Les Hall embraced the company policy of setting annual, three-year and ultimate goals, both in business and personal life. “One of my personal goals was to purchase a farm,” says Hall, who grew up in rural North Carolina. When he retired in 2010, he did just that, coming full circle after a 40-year career in water and wastewater.

After high school, Hall left the family farm to pursue civil engineering at NC State in Raleigh, NC, eventually earning a masters degree with a focus in what was then called sanitary engineering. His Masters studies even included a stint with the US Geological Survey, working in the hydrology of water, doing stream and groundwater measurements.

Upon graduation, he accepted a job with Henningson, Durham and Richardson (now HDR) Engineering in Charlotte, NC. The year was 1972 and the Clean Water Act had just been passed. It was a busy time for the industry. Starting as a project engineer, Hall rose to the position of senior project manager, helping clients solve water and wastewater issues and designing treatment plants.

Then in 1984, he left HDR to buy in as a part owner with a small firm in Wilmington, NC. The two owners of the company, Herb McKim and Mike Creed, were both structural engineers. “I had experience in the municipal marketplace,” explains Hall. “They wanted to expand and grow the company in that arena and so they hired me to head up a section that would do that.”

Under Hall’s direction, the section that had started with six people grew to a staff of almost 200 by the time he retired 25 years later. Meanwhile McKim & Creed expanded from a single office in Wilmington to a southeast regional firm with offices from Virginia Beach, Virginia, to Raleigh, Charlotte and Greensboro in North Carolina, to Clearwater, Orlando, Fort Meyer and Daytona Beach in Florida.

Meanwhile, Hall continued to be increasingly involved in the NC AWWA-WEA. Joining as a member right at the beginning of his career, he was eventually elected to the position of National Director for the Water Environment Federation (WEF) in 2000, serving for a three-year term. Then in 2007, he became Vice Chair of the NC AWWA-WEA, then Chair-Elect and finally, Chair in 2009.

In 2008, Chair Steve Shoaf formed a Task Force to evaluate alternatives by which the Association could establish a sustainable source of funding for scholarships for university and community college students and grants for environmental educators. After the study was completed in 2009, the Board of Trustees approved the NC Safewater Endowment Fund as the vehicle for providing this sustainable source of funding. Under Hall’s leadership, the Board of Trustees approved $25,000 as seed money to establish the NC Safewater Fund. The Public Education Committee also donated $25,000 from monies it had accumulated over several years to establish...
"Under Hall’s direction, the section that had started with six people grew to a staff of almost 200...”

The Carol Bond Fund. Then, thanks to a fundraiser held last summer as well as other initiatives implemented by the Endowment Committee, the Fund increased in value from $50,000 to almost $350,000 as of June 2012. “I hope to be involved in increasing the endowment to $1 million,” says Hall.

Over the years, his commitment and dedication to the Association and the industry has been recognized by several tributes including the Arthur Sidney Bedell Award in 2003, the George Warren Fuller Award in 2005, and the Kasey Munroe Outstanding Service Award in 2011. Hall is also a lifetime member of both the AWWA and WEF as well as a fellow of the National Society of Professional Engineers.

In 2009, Governor Purdue of North Carolina also recognized Hall’s experience and expertise with an appointment to the Environment Management Commission, which regulates and sets the rules for water and wastewater systems in North Carolina as well as for water reuse, stormwater, and air pollution. The Commission meets for two days every two months, in between public consultations.

“It gives me an opportunity to keep my fingers in the profession and to keep up-to-date with what is going on,” says Hall. Although his work with the Commission and the Association keep him fairly busy, he still finds time for personal pastimes.

“I have retired from day-to-day project work,” he confirms. “I have always had some hobbies I wanted to pursue and I have had the opportunity to do that through retirement.”

On the 60-acre farm that he and his wife purchased, the couple has started a large garden, growing everything from corn, okra and tomatoes to winter kale and collard greens. The acreage has also provided enough room for Hall to build a good-sized woodworking shop where he can spend time doing turnings on the lathe, building furniture and carving wood. The property includes 45 acres of wooded land with several varieties of trees, including pine, maple, sycamore and cedar. “It’s a source of wood for my woodworking shop,” says Hall. “I can become self-sufficient.”

That is not to say he and his wife will be spending all their time alone. In fact, one of the other advantages of having the farm is the opportunity to have grandchildren visit and commune with nature – and their grandparents of course. With all eight living within a half-hour drive, there are ample opportunities for spending plenty of time together.
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Maggie Macomber has a gift for planning. Whenever the Civil Environmental Engineer has handled small construction projects for Charlotte Mecklenburg Utilities, helped organize the Annual Conference for the NC AWWA-WEA or brought together her relatives for a family reunion, her strong organizational skills have come in handy.

Take for instance, the 63rd anniversary celebration she organized for her grandparents a few years ago. Macomber managed to have the couple stay in the same Chicago hotel where they spent their honeymoon – for the same rate they had paid in 1945. Except that, this time, they stayed in the penthouse suite. The owners of the hotel, who were looking for historical artifacts to include in its renovation, agreed to the $9 rate in exchange for the hotel receipt that her grandmother had kept for more than six decades.

“My family played a huge part in my life,” says Macomber, adding that her grandfather was a well driller, her mother was a professional organizer and her father was an engineer. While she was growing up, her parents were always taking the family boating and vacationing in national parks, inspiring a passion for the environment that has guided her life ever since.

When Macomber entered university, she knew she wanted to be a civil environmental engineer. But she was not sure if she wanted to focus on air quality, hazardous waste or water and wastewater.

“What got me started in water and wastewater was a very passionate professor I had at Virginia Tech,” she recalls. “His enthusiasm was contagious.”

Upon graduating in 1997, she accepted a position with Black & Veatch in its Charlotte Office. The following year, she joined the NC AWWA-WEA and never looked back. “I had several really wonderful mentors who thought it was important to contribute to our industry and really instilled that in me,” explains Macomber.

Over the years, she has served on a number of committees, including Public Education, Membership, Seminars and Workshops, and Local Arrangements, while teaching at the western biological wastewater schools. She singles out Jim Hawkins of Black & Veatch and Trille Men-denhall of Charlotte Mecklenburg Utilities (CMU) as particularly strong influences on her volunteerism.

“CMU has been hugely supportive of me and coworkers being active in the Association and I really appreciate that opportunity,” says Macomber. “Other folks like Jackie Jarrell, Kasey Monroe, Pam Moss, Robert Walters, Mike Richardson, etc., have all been so supportive and great role models!”

On the work front, Macomber joined CMU’s Environmental Management Division in 2006 as a Treatment Plant Engineer, serving as a liaison with the engineering division and working closely with plant managers, maintenance staff and the Water Quality Group. Two years later, she and her husband welcomed a son. After scaling back on volunteering to focus on work and parenting, she recently returned to serving the NC AWWA-WEA as a member of the Nominating Committee.

Meanwhile, work has been busier than ever. While the downturn in the economy has decreased demand on water, pollutant concentrations in wastewater have increased, as has illegal dumping. “We have a pretreatment group within our Environmental Management Division that has been working hard to find out who is releasing wastewater without permits,” notes Macomber.

If anything, the challenges have made the civil environmental engineer even more passionate about her work. Macomber is very proud of her membership in the SS Society and all that her golden shovel represents. “The biggest thing for me is knowing I am having an impact on the environment,” she says. “People in our industry are true environmentalists. We have an important mission, including educating the public to help us keep our water clean.”

She notes how much she enjoys working with people in the industry, from her colleagues at the utility to consultants and manufacturers. At the same time, her volunteer work gives her plenty of opportunities to meet people from across the state and beyond.

Along with her strong sense of planning, Macomber has always had a keen interest in other lives, geographies and cultures. She has travelled throughout Europe and in all but eight or 10 of the states in the United States. Her plan is to get to those very soon. Organizing a trip with a family that includes two youngsters, a rabbit and a Great Dane can be daunting. But, for Macomber it is a challenge she is more than happy to undertake.

“I had several really wonderful mentors who thought it was important to contribute to our industry and really instilled that in me.”

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The sheer joy of snorkeling in the crystal clear waters off the US Virgin Islands this summer reaffirmed what Wayne Miles already knew: protecting the water environment is paramount. It is a passion to which the environmental engineer has devoted his entire career. As Vice President of CDM Smith, he leads the company’s infrastructure services group in the Southeast. Miles has assisted more than 50 communities in 15 states to identify priorities, develop budgets, and justify the need for infrastructure upgrades and renewal.

Although the projects have all been different, they share one commonality. Technical people need to present findings and communicate needs in terms that business and financial people can understand. “They are usually the ones making the financial decisions within a utility and setting priorities as to where funding should be spent,” explains Miles. “The better we can communicate our needs and resource requirements in a way that makes sense to them, the better we will be able to serve our function.”

Historically, wastewater collection systems have been an underfunded aspect of utilities, especially in the southeastern US. “As an industry, we are getting much better at being able to communicate needs along with the benefits that come from these types of investments,” notes Miles. Those benefits, he adds, include improving public health and reducing both the impact on the environment and the risk to society. Allowing infrastructure to decay to the point of failure can create significant risk to other infrastructure such as streets and adjacent utilities. “It really is our job to help communicate those risks as well as the return on investment of rehabilitating sewer systems,” says Miles. They don’t get the same attention as other infrastructure.”

“Not too many politicians want their name on a sewer system,” he points out. “But I do think the public is becoming much more aware of water quality-related issues and their importance.”

He believes that North Carolina, in particular, is ahead of most states in the country in terms of awareness and, as a consequence, is investing more appropriate amounts into their sanitary sewer systems than other states have been. This reality is reflected in a lower incidence of regulatory enforcement actions.

“In general, North Carolina utilities have done a very good job of investing and performing the operation and maintenance required so that their systems perform well,” says Miles. “I truly think the Association has played an important part in that role through education programs, seminars, and collection and distribution schools. These education programs go a long way to helping engineers, managers and operators understand why it’s important to make those investments.”

Miles became involved with the collections and distribution schools early on in his career. He found the schools to be an excellent introduction to the industry and a way to pass on the knowledge and information that had inspired him to join in the first place.

After a false start in electrical engineering at the University of Florida, Miles found his true calling thanks to the encouragement of his hydraulics professor who introduced him to environmental engineering. Growing up in upstate New York, Miles spent plenty of time outdoors, playing hockey in the winter and fishing in the summer. He realized that a career that involved applying engineering to solve problems in
natural systems was a better fit. “I signed up and never looked back,” he recalls.

It was in Florida that he started snorkeling. But it was not until after he joined CDM Smith and moved to Raleigh that he became an enthusiastic hockey fan. Since then, cheering for the Carolina Hurricanes had become one of his most ardent passions.

So has volunteering for the industry he embraced. When Miles joined the NC AWWA-WEA, there was no Wastewater Collection Committee. “I saw that it was a big need and convinced the Board to create one,” he explains. “I have enjoyed seeing the committee grow far beyond what I had envisioned.”

In 2004, Miles was awarded the NC AWWA-WEA Red Ebert Award for his contributions to collection and distribution system operations and maintenance. Two years later, he joined the Board of Directors as Treasurer, serving until 2008.

Since then he has been increasingly involved with the Water Environment Federation (WEF) National Collection Systems Committee, first as a member of the Steering Committee until 2009 and now as a member of the Specialty Conference Committee, and the Government Affairs Committee.

He enjoys having the ability to provide input at a national level, to organizations such as the Environmental Protection Agency (EPA), on pending policy decisions and legislation that impacts the industry. “It is important to ensure that policies are not only beneficial, but realistic and implementable,” he points out.

But perhaps the contribution of which he is the most proud is his involvement, from 2008 to 2010, in rewriting two WEF Manuals of Practice related to Wastewater Collection Systems Management and Existing Sewer Evaluation and Rehabilitation. “CDM Smith has encouraged me to take advantage of some great opportunities,” says Miles, “and North Carolina has been a wonderful place to work. Being a member of this industry continues to be an exciting challenge and a privilege.”

“It is important to ensure that policies are not only beneficial, but realistic and implementable.”

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[www.ncsafewater.org](http://www.ncsafewater.org)
## WATER CERTIFICATION QUESTIONS

1. Which type of valve will prevent the collapse of a pipe?
   - a) Pressure-relief valve
   - b) Needle valve
   - c) Pinch valve
   - d) Vacuum relief valve

2. The correct protective methods for backflow-prevention devices in order of decreasing effectiveness are
   - a) air gap, VB, RPZ, and DCVA.
   - b) air gap, VB, DCVA, and RPZ.
   - c) air gap, RPZ, VB, and DCVA.
   - d) air gap, RPZ, DCVA, and VB.

3. Which one of the following is a type of joint for ductile iron piping?
   - a) Expansion joint
   - b) Push-on-joint
   - c) Bell and spigot with rubber o-ring
   - d) Rubber gasket joint

4. In general, areas that require high fire flow capacity require the minimum static pressure to be
   - a) 25 psi or greater
   - b) 30 psi or greater
   - c) 35 psi or greater
   - d) 40 psi or greater

5. A corporation stop is used for a
   - a) service line
   - b) pump discharge line
   - c) tank inlet
   - d) tank outlet

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### Answers:


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### Certification Information

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

**NC Board of Examiners for Engineers & Surveyors**
919-791-2000
Exam Dates:
10/26/12, 4/12/13, 10/25/12
www.ncbels.org
Responsible for Professional Engineers

**NC Water Treatment Facility Operators Certification Board**
919-707-9040
http://www.ncwater.org/pws/
Exam Dates:
10/25/12
Responsible for Drinking Water Certifications (Surface, Well, Distribution, & Backflow/Cross-Connection)

**Water Pollution Control System Operators Certification Commission**
919-733-0026
http://h2o.enr.state.nc.us/tacu/training.html
Exam Dates:
11/8/12, 2/28/13, 5/30/13, 8/29/13, 10/31/13
Responsible for Wastewater Certifications (Animal Waste, Biological WW, Physical/Chemical, Land Application, Spray Irrigation, Collections, Subsurface, and OIT)
WASTEWATER CERTIFICATION QUESTIONS

1. All new sewer lines constructed of flexible types of pipe should be Mandrel tested to see if
   a) they pass the infiltration test.
   b) they do not go above the allowable leakage on the air test.
   c) the pipe is within the allowed tolerances for deflection and joint offsets.
   d) the line has the correct amount of grade per the construction plans.

2. Nameplate data on a pump or motor will include all of the following except
   a) serial number    b) model number    c) installation date    d) horsepower    e) volts

3. When filling the water tank on your combination cleaning truck or Jet trailer,
   a) make sure all of the tires are properly inflated.
   b) flush the hydrant till the water runs clear before attaching your fill hose to the hydrant.
   c) fill the tank as fast as you can to eliminate down time.
   d) do it in a very secluded place so the public will not know what you are doing.

4. True or False: Most agencies either use a power rodding machine or a high velocity cleaner (combination truck) but never both.

5. A pump is required to deliver 250 GPM at 100 feet head. Compute the water HP, brake HP, and the motor HP if the pump efficiency is 82% and the motor efficiency is 92%.
   a) 45.5; 55.4; 60.3    b) 8.4; 6.9; 6.3    c) 6.3; 7.7; 8.4    d) 8.4; 10.2; 11.1    e) 6.3; 5.2; 4.8

6. What is the slope of a pipe dropping 1.92 feet in elevation 320 feet of length?
   a) 0.0060 ft./ft.    b) 0.0060 ft./ft.    c) 0.1667 ft./ft.    d) 6%    e) 166.67 ft./ft.

Answers:
5. c) Calculation: WHP = (Q in gpm)(H in feet)/3,960 = (250)(100)/3,960 = 6.3 HP.
   BHP = WHP/pump effic. = 6.3/0.82 = 7.7 HP.
   MHP = BHP/motor effic. = 7.7/0.92 = 8.4 HP.
6. b) Calculation: Slope = rise/run = 1.92 feet/320 feet = 0.0060 ft./ft.

MAINTENANCE TECHNOLOGIST QUESTIONS

1. NLGI stands for
   a) non lithium grease index    b) national lubricating grease institute
   c) normal lubrication grade isopolymer    d) national listing grease index

2. Which type washer would be best to use on vibrating machinery?
   a) Flat washer    b) Ceramic washer
   c) Slotted washer    d) Belleville washer

3. For electrical wire, #10 copper conductor is larger than #18 copper conductor.
   True    False

4. The National Fire Protection Association (NFPA)
   a) publishes the National Electrical Code
   b) requires employers to provide a safe working environment
   c) enforces compliance through inspections
   d) both b and c above

5. When aligning driven and driving components, ‘Soft Foot’ correction is the final step.
   True    False

Answers:
1. b) Grease is assigned a NLGI hardness number ranging from zero through six. Zero is semi-fluid and six is solid like a bar of soap.
   This number is determined by dropping a pointed weight into a layer of grease and determining the depth of penetration.
2. d) Belleville washers have a slightly cupped shape that gives them spring-like flexibility to resist loosening due to heat or vibration.
3. True.
4. a) The NFPA published the National Electrical Code. Answers B and C are are both functions of OSHA.
5. False: Soft Foot is the first step in any alignment procedure. It is generally corrected using shims.
Information provided by Water Plant Operators Steve Corriher, Rodney McDaniel, Steve Hatley and ORC Michael Weir and Public Utilities Director Johnny Lambert
Article created by: David Hamilton, PE / Malcolm Pirnie/ARCADIS (NC AWWA-WEA Plant Operations & Maintenance Committee)

**Plant Spotlight: Cooleemee Water Treatment Plant**
Davie County, NC

**Introduction**
In this time of ‘make it last’ and ‘stretch your dollars’, the Cooleemee Water Treatment Plant (WTP) is a testament to infrastructure longevity. At 86-years-young this facility has treated water for potable use without interruption throughout its history – and done it well. Where some aging facilities are just hanging on for dear life as regulations change and tighten, Cooleemee’s operators eagerly look forward to the future, stating that their 2012-13 goal is to achieve the Area Wide Optimization Program (AWOP) Award for turbidity removal of 95% of filtered water samples at less than 0.1 nephelometric turbidity units (NTU) (as their sister facility, the Davie County Sparks Road WTP, has done the past two years). These are not the aspirations of a dilapidated, waning operation; they are the expectations of an improving treatment facility and a proud group of operators who refer to each other as family.

**Treatment History**
The water plant began operation in 1926 in the small town of Cooleemee (located in south-central Davie County in the North Carolina Piedmont) as a water supply for the Erwin Textile Mill on the South Fork of the Yadkin River. The constructed raceway off the river supplied the mill with hydro-power. Today, the water plant sits on the hill overlooking backup raw water pumps that draw from this same raceway when needed. However, the raw water pump station for the water plant was originally on the river at the dam built to create the raceway, where the current station is today. The dam provides the necessary pool for the pump station, but it also creates a scenic waterfall and downstream swimming area now known as Bullhole Park; but more on that later.

As close as the current institutional memory can tell, the evolution of the water plant went something like this:

- In 1926, static mixing using over/under weirs, one sedimentation basin (sloped to a drain), two filters (Wheeler Bottoms), alum (dry) and chlorine (gas), clearwell (open top) were added;
- in 1939, one sedimentation basin and two filters were added;
- in 1955, one sedimentation basin and two filters were added;
- in 1987-89, one sedimentation basin was added, a 0.5 MG standpipe was relocated from the distribution system to the plant for transfer storage, and clearwell baffles, two transfer pumps (from clearwell to standpipe) with vacuum priming, two high service pumps (from standpipe to distribution system) were added while the chlorine (gas) was upgraded;
- in 2003, the coagulant was changed to ferric sulfate (liquid);
- in 2008, mechanical flash mixers and flocculators were added;

- Filter pipe gallery.
- Raw water pump station, Cooleemee Dam, and Bullhole Park (background).
- Historical Sign.
Plant Spotlight

Treatment Processes
Cooleemee is a conventional treatment facility with pH adjustment (caustic soda), rapid mix/coagulation (ferric sulfate)/flocculation, sedimentation, filtration, disinfection (chlorine gas), fluoride addition, finished water storage and transfer to additional elevated (stand-pipe) storage for pumping to the distribution system.

Solids Management
Waste solids go directly to the sanitary sewer system. The high volume filter backwashes do take a detour through a holding basin for a controlled release to the sewer.

Monitoring and Control
Cooleemee WTP has a full-plant SCADA system with the most notable recent addition (ongoing project) being filter effluent valve control. The operators report that so far, with the recent filter automation, they have been able to fine-tune operations, waste less treated water, save more chemicals, and achieve higher filter run times. They expect even better results when all remaining filters are fully automated.

Expansion Potential
Davie County is investing nearly $1.5M in upgrades at the facility now and throughout the coming year (electrical, new raw water and high service pumps, and reroofing the clearwell), but the plant capacity will remain at 2.0 MGD. Capacity addition beyond this would likely require expansion on an adjacent site due to limited available space and concerns about the aging structure (basins, etc.).

Challenges
The plant staff says that meeting the changing and increasing regulations with an 86-year-old facility is the biggest challenge. It is a notable accomplishment that the County is meeting the Stage 2 D/DBP Rule requirements without enhancements to the sedimentation basins (i.e. no tube settlers, no sludge collectors, etc.) or filters (no air wash, etc.).

Personnel
Staff
Operations and maintenance staff include three personnel plus one person who shares time between Cooleemee and Sparks Road plants. These are also the laboratory staff. (The Public Utilities Director constitutes the administrative staff for the Davie County treatment plants). The plant operates 18-20 hours in the summer and 10-12 hours the remainder of the year. With the limited staff, cooperation and a ‘strong brotherhood’ have developed among staff members to keep the facility running smoothly.

Staff Development
Most of the operators, and all of the senior operators and supervisory staff, possess a state A-surface license certification. The County provides continuing education opportunities through membership and encouraged participation in AWWA and RWA.

Health and Safety
The County provides health and wellness programs and has a dedicated health and safety officer for the Public Utilities Department.

Other/Unique Attributes
The Cooleemee WTP raw water pump station on the South Yadkin River is just a couple hundred yards upstream from the plant along the mill raceway. The pump station shares a scenic and lively, yet somehow soothing, part of the riparian landscape with River Park at Cooleemee Falls – The Bullhole (locally referred to as simply ‘Bullhole Park’). This park on the Davie County/Rowan County line has long been a spot for recreation and enjoyment of the small natural falls here. Today it offers picnicking, a sandy beach with swimming/wading/tubing areas, a canoe landing, and of course a fantastic view of the higher waterfalls created by the dam dating back to the early 1900’s.

Cooleemee WTP, with its well preserved history and its constant look to the future, is truly a unique place.

Contact information for more on the Cooleemee Water Plant
Steve Corriher, Senior Operator (cooleemewtp@co.davie.nc.us and 336-284-2028) or Johnny Lambert, Public Utilities Director (johnny.lambert@co.davie.nc.us and 336-753-6090).
NC AWWA-WEA
92nd Annual Conference
November 11-14, 2012

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Engineering BETTER SOLUTIONS To Environmental Challenges

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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 92nd Annual Conference will be held November 11-14, 2012 at the Raleigh Convention Center in Raleigh, 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. 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.

Raleigh, the host city, has earned a reputation as the best place to live and work in the nation, the place with the best business climate, and the best place in the US for educational opportunities. These are just a few of the many national and international accolades that Raleigh and the Triangle Region have received from publications including Money, Fortune, and Time magazines. This area’s name is derived from its geography, with points of the triangle anchored by North Carolina State University (NCSU) in Raleigh, Duke University in Durham, and the University of North Carolina (UNC) in Chapel Hill – three of the nation’s top research universities. The area is also home to the internationally acclaimed Research Triangle Park.

We look forward to seeing you on Sunday, November 11 as you kick-off your conference experience with one of two great recreational events. Set your sights on a day of sporting clays or choose to tee-off in our annual golf tournament.

Deep River Sporting Clays (www.deepriver.net) in Sanford will host the SPORTING CLAYS EVENT. Deep River has a 13-station sporting clays course and registration begins at 10:30 am with lunch at 11:30 am and a shotgun start at 12:30 pm. Join us in the big field for some fun and games after the competition. Lunch and prizes will be provided by our sponsors.

The GOLF TOURNAMENT will take place at the NCSU Lonnie Poole Golf Course. Registration and Breakfast will start at 8:30 am. Cost per player is $95.00 and includes green fee, cart, range balls, breakfast, lunch, closest to pin contest for all five par threes, long drive men’s and women’s, and prizes for winners of all four places. Sign up as a team or come as an individual.

The Exhibit Hall will be filled with 154 vendors, eager to share their knowledge with attendees and thanks to the flexible conference schedule, there will be ample time to talk. The exhibit hall will open Sunday evening at 5:00 pm with an extended reception and buffet dinner where we will announce the golf and clay shoot winners, induct new members into 5-S, and present the Golden Manhole Awards.

On Monday and Tuesday, buffet-style lunches will be served in the exhibit hall with tables scattered throughout the hall so you can conveniently stop and talk as you eat. Another social will take place in the exhibit hall on Monday from 6:00 pm – 7:00 pm with complimentary hors d’oeuvres and sodas as well as 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. Exhibitors will also be able to get in on the competitive atmosphere with a ‘Best in Show’ award. On Monday, secret shoppers will roam the exhibit hall seeking out exhibitors who really set themselves apart from the others. The winner will receive $100 off the purchase of an exhibit booth at the 2013 conference.

With so much to do inside and outside of the exhibit hall, do not forget that the exhibit hall will close on Tuesday at 1:30 pm 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 Opening Session and Operators
The Annual Conference shines on Veteran’s Day, our Keynote Speaker will be Chief Warrant Officer 5, James “Scott” Harrison. We will be fortunate to have in attendance national officers from both of our parent organizations, the American Water Works Association (AWWA) and the Water Environment Federation (WEF). Time will be set aside during the Opening Session and Operator Awards to hear their remarks on the state of the industry. In celebration of our operations personnel, operator awards will also be presented during this time.

The remainder of Monday and all of Tuesday will be filled with thirty-minute technical sessions, offered all day. Technical session tracks include water, wastewater, collection and distribution, operations, policy and management, and special topics. Wednesday’s program will consist of a forum entitled Hydro-Fracturing: Implications for Course Water Protection & Treatment.

**Continuing Education Units (CEUs)** will be offered for the Opening Session, 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.

We are very excited to offer an unconventional FACILITY TOUR to two local breweries. The adult beverage industry relies heavily on the time and talents of water and wastewater professionals. High quality water is a critical raw material for high quality beer; and adequate wastewater treatment is crucial to insuring the blowdown from fermentation vessels does not adversely impact our aquatic ecosystems. Raleigh is lucky enough to be home to a number of great breweries, two of which we will be visiting on our tour. Natty Green’s and Boylan Bridge Brewpubs both produce a number of great beers using City of Raleigh water and are an easy walk or bus ride (free on the Raleigh Circulator) from the Raleigh Convention Center. Be sure to register and pay for the Monday afternoon tour when you register for the conference – space will be limited. This will be a tour you will not soon forget.

The popular PIPE TAPPING CONTEST will take place on Monday, November 12 at 1:45 pm in the exhibit hall. In this competition of skill, teams compete for the best time opening a cement-lined, ductile iron pipe and installing a tap.

To accommodate the expanding OPERATIONS CHALLENGE contest, these four events will be held at various times on Monday and Tuesday. Building on last year’s expansion to include the Laboratory Event along with the Collection Systems and Pump Maintenance Events, this year will add the Process Control Event – bring the North Carolina competition one event away from featuring all five events included in the national competition.

Make sure to check out the CHAIR’S DESSERT RECEPTION, at the Oxford, just a short distance from the Convention Center. This event will be held on Monday night beginning at 8:30 pm and there will be free handcrafted desserts and live acoustic entertainment. Two raffles will take place to raise funds for the NC Safewater Endowment Fund. The first raffle is for a beautiful painting donated by one of Eastern NC’s most admired artists, Bob Pittman. The painting titled Red Sky at Night Ocrocok is acrylic on canvass and 48 inches by 36 inches. Raffle tickets may be purchased for $100 each from Les Hall. One hundred tickets will be sold, and the drawing will be held during the Chair’s Dessert Reception. You do not have to be present to win this drawing. Another drawing will take place on-site at the Chair’s Dessert Reception offering a variety of donated goodies.

If you have ever been disappointed that you have had to miss the BEST TASTING WATER CONTEST because it took place on Wednesday after you had left the conference, your disappointment ends this year. This competition for bragging rights has been moved to the Exhibit Hall and will be held Tuesday at 11:30 am, just in time for lunch and as a final event before the Exhibit Hall closes. 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 5:00 pm on Sunday, November 11. In order to participate, samples must be turned in at the conference registration desk by 5:00 pm on Sunday, November 11.

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 who make things happen. Starting with the GAVEL GALA and AWARDS at 5:30 pm you can sit in on the Annual Business meeting, witness the installation of the 2013 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. The official AWARDS BANQUET will get started at 7:00pm and will honor several outstanding people in our industry. If you will not be able to stay for the Awards Banquet, make plans to visit the Hall of Honor located in the Exhibit Hall to see lists of most of this year’s award winners.

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 FREE MONDAY-ONLY REGISTRATION. To take advantage of this offer, or learn more about any of the available student activities, contact Mary Knosby at (704) 338-6857 or mary.knosby@hdrinc.com. 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. Monday’s STUDENT APPRECIATION LUNCH is also a great place to meet students from other schools and professionals interested in getting the next generation involved. The INDUSTRY NEWCOMER RECEPTION is another great time for students to continue networking.

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. Monetary prizes will be awarded for first, second and third place posters. NEW THIS YEAR – the first place winner will be awarded the opportunity to present his or her poster at the national AWWA ACE conference.

Make the most of your conference attendance and stay close by at the Marriott City Center or the Sheraton Raleigh Hotel. Special room reservation rates are available until October 11, 2012.

There are so many exciting things at this year’s conference that you will not want to miss. Discounted Registration Rates end October 21 so make your reservations early. If you are not already a member, consider joining the AWWA, WEF or NC State Level Association Membership (SLAM) to take advantage of the benefits these organizations offer as well as a discounted conference registration rate. Join your industry’s peers and take advantage of the countless opportunities this conference has to offer. We look forward to seeing you in beautiful downtown Raleigh!
## Schedule at a glance

### Sunday, November 11

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>8:00am - 3:30pm</td>
<td>Exhibit Hall Set-up</td>
</tr>
<tr>
<td>8:30am</td>
<td>Golf Tournament</td>
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<tr>
<td>10:30am</td>
<td>Clay Shoot</td>
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<tr>
<td>12:00pm - 8:00pm</td>
<td>Committee Display Tables</td>
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<tr>
<td>3:00pm - 5:00pm</td>
<td>Board of Trustees Meeting</td>
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<tr>
<td>3:00pm - 6:00pm</td>
<td>Conference Registration Desk Open</td>
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<tr>
<td>5:00pm - 8:00pm</td>
<td>Exhibit Hall Open</td>
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<tr>
<td>5:00pm - 8:00pm</td>
<td>Exhibit Social</td>
</tr>
<tr>
<td>7:30pm - 8:00pm</td>
<td>Award Presentations</td>
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### Monday, November 12

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>6:30am - 5:30pm</td>
<td>Conference Registration Desk Open</td>
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<tr>
<td>7:00am - 7:00pm</td>
<td>Committee Display Tables</td>
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<tr>
<td>7:30am - 9:00am</td>
<td>Opening Session and Operator Awards</td>
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<tr>
<td>8:00am - 5:00pm</td>
<td>Student Poster Contest</td>
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<tr>
<td>9:00am - 7:00pm</td>
<td>Exhibit Hall Open</td>
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<tr>
<td>9:15am</td>
<td>Operations Challenge Collection System and Pump Maintenance Events</td>
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<tr>
<td>9:15am - 5:10pm</td>
<td>Technical Sessions</td>
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<tr>
<td>11:30am - 1:20pm</td>
<td>Association Buffet Lunch</td>
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<tr>
<td>12:00pm - 1:45pm</td>
<td>Student Lunch</td>
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<td>1:00pm</td>
<td>Facility Tours</td>
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<tr>
<td>1:45pm</td>
<td>Pipe Tapping Contest</td>
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<td>3:00pm - 3:30pm</td>
<td>Afternoon Break</td>
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<tr>
<td>5:00pm - 7:00pm</td>
<td>Exhibit Social</td>
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<tr>
<td>5:15pm - 6:00pm</td>
<td>Industrial Reception</td>
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<tr>
<td>5:15pm - 6:00pm</td>
<td>Industry Newcomer’s Reception</td>
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<tr>
<td>8:30pm - 11:30pm</td>
<td>Chair’s Endowment Dessert Reception and NC Safewater Endowment Raffle</td>
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### Tuesday, November 13

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>7:00am - 8:00am</td>
<td>SS Breakfast (SS Members Only)</td>
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<tr>
<td>7:30am - 1:20pm</td>
<td>Committee Display Tables</td>
</tr>
<tr>
<td>7:30am - 5:30pm</td>
<td>Conference Registration Desk Open</td>
</tr>
<tr>
<td>8:00am - 1:30pm</td>
<td>Exhibit Hall Open</td>
</tr>
<tr>
<td>8:00am - 4:50pm</td>
<td>Technical Sessions</td>
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<tr>
<td>9:00am</td>
<td>Operations Challenge Process Control Event <em>NEW</em></td>
</tr>
<tr>
<td>9:40am - 10:15am</td>
<td>Morning Break</td>
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<tr>
<td>10:30am</td>
<td>Operations Challenge Laboratory Event</td>
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<tr>
<td>11:30am</td>
<td>Best Tasting Water Contest</td>
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<tr>
<td>11:30am - 1:20pm</td>
<td>Association Buffet Lunch</td>
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<tr>
<td>2:15pm - 2:45pm</td>
<td>Afternoon Break</td>
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<tr>
<td>5:30pm - 7:00pm</td>
<td>Festivities: Gavel Gala and Awards Reception</td>
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<tr>
<td>7:00pm - 10:00pm</td>
<td>Awards Banquet</td>
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### Wednesday, November 14

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00am - 9:00am</td>
<td>Coffee</td>
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<tr>
<td>8:00am - 11:30am</td>
<td>Conference Registration Desk Open</td>
</tr>
<tr>
<td>9:00am - 11:00am</td>
<td>Forum: Hydro-Fracturing: Implications for Source Water Protection &amp; Treatment</td>
</tr>
<tr>
<td>11:30am - 2:30pm</td>
<td>Board of Trustees Meeting</td>
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</table>
**SIMPLE FACTS ABOUT RBC’s:**

1. The Walker Envirodisc has the longest successful operating history of any RBC manufactured today.
2. Surveys have indicated that the very vast majority of RBC operators are well satisfied with the RBC process at their facilities.
3. Regarding upgrades and expansions at facilities currently operating RBC’s, staying with the RBC process can save from 40-60% of the overall project cost.
4. At RBC facilities that performed upgrades and/or expansions that went with an alternate form of process, energy usage increased by as much as 50%.
5. Every unit process at a facility requires maintenance. When properly maintained, those unit processes - including RBC’s, mechanical concerns are minimized or eliminated.

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<thead>
<tr>
<th>TIME</th>
<th>WATER</th>
<th>WASTEWATER</th>
<th>COLLECTION &amp; DISTRIBUTION</th>
<th>SPECIAL TOPICS</th>
<th>POLICY &amp; MANAGEMENT</th>
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### Technical Schedule - Tuesday

<table>
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<th>TIME</th>
<th>WATER</th>
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<th>POLICY &amp; MANAGEMENT</th>
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<tbody>
<tr>
<td>12:00 pm - 12:30 pm</td>
<td>Water Master Plan Analysis for Criticality and Fire Flow Laura Siemers - GHD</td>
<td>MBBR to MBR - Unique Process Configuration For Pharmaceutical Wastewater Treatment Please Daniel Wilkinson, PE - Dewberry</td>
<td>So You Have a Sewer Model, Now What??? Rebecca Cramer - Malcolm Pirnie/Arccadis</td>
<td>Supporting the Vision of Utility Sustainability: Raleigh’s Consideration of Municipal Owned and Operated Hydroelectric Power Kenneth Waldroup, PE - City of Raleigh Public Utilities</td>
<td></td>
</tr>
<tr>
<td>12:35 pm - 1:05 pm</td>
<td>Fluoride Tracer Study for Validation of a Hydraulic Model to Assess Water Age Throughout a Distribution System in Fayetteville, NC Angela Watson, ET - Dewberry</td>
<td>Evaluation of PEG Treatment Using MBR and MBBR Katie Jones, PE - Dewberry</td>
<td>A Comprehensive Mechanistic Model Showing How Fat, Oil, and Grease (FOG) Deposits Form in Sewer Lines Xia He, NCUS</td>
<td>Defining and Enhancing the Water Yield of the Catawba-Wateree River Basin Mary Knoorly, PE - HDR Engineering</td>
<td></td>
</tr>
<tr>
<td>1:45 pm - 2:15 pm</td>
<td>A Comparison of Ground Versus Elevated Water Storage Brian Tripp, PE, BCEE - WK Dickson</td>
<td>Meeting Nutrient Requirements with Advanced Filtration Technologies Filter Testing Results and Evaluation of Two North Carolina Treatment Facilities Jason Beck, PE - CDM Smith</td>
<td>Take Your Hydraulic Model off the Shell - An Applied Example Reid Campbell, PE - AECOM</td>
<td>Reclaimed Municipal Wastewater for Cooling Towers – Opportunities and Obstacles Ivan Cooper, PE, BCEE - Golder Associates</td>
<td></td>
</tr>
<tr>
<td>4:30 pm - 5:00 pm</td>
<td>Cooperation Makes Communications Happen - Implementation of a New SCADA System Infrastructure Michael Tweedeel, PE - McKim and Creed</td>
<td>Girl Happens - You Don’t Know What You Are Missing Pat Herrick - Hydro International WW Division</td>
<td>Asset Management Approach to Water and Wastewater Master Planning William Williams - Black &amp; Watch</td>
<td>Reengineering the District of Columbia Street Sweeping Program for Municipal Separate Storm Sewer System (MS4) Permit Compliance Erika Janifer, Malcolm Pirnie / ARCADIS</td>
<td></td>
</tr>
</tbody>
</table>

A buffet lunch will be served in the exhibit hall from 11:30am - 1:20pm.
Exhibitors

Advanced Enterprise Systems
Contact: Ed Melanson
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Pipe Tapping

Operations Challenge

Tuesday Lunch

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Pipe Tapping & Operations Challenge

Rising to the Challenge

At the NC AWWA-WEA Annual Conference in November, two teams will be poised to defend their titles: Team MSD Flow Motion, winners of last year’s Operations Challenge and the City of Concord’s Smoking Bits, winners of the Pipe Tapping competition. By winning the state contests, both teams qualified to compete at the national level.

Pipe Tapping and Operations challenge contests are among the some of the most popular events at the NC AWWA-WEA Annual Conference. Competing requires teamwork, skill and communication in order to successfully complete the required tasks as fast as possible. Last year’s winning teams certainly exemplify these attributes.

Operations Challenge:

Team MSD Flow Motion

At the 2011 state conference, MSD Flow Motion emerged as the winners in the Operations Challenge and will be representing North Carolina at the Water Environment Federation Technical Exhibition and Conference (WEFTEC) in New Orleans this October. The team from the Metropolitan Sewerage District of Buncombe County consists of Jason Brigham (captain) Shaun Armistead, Gilbert Karn, Jason Price and Mike Rice (alternate), with Ben Reeves as the coach.

This will be Flow Motion’s first time at the national competition. WEFTEC’s annual Operations Challenge features five events: collection systems, laboratory, process control, maintenance and safety. Until two years ago, North Carolina’s state competition was limited to collections. Then, in 2010, NC AWWA-WEA added a pump event.

“We were not really prepared for that,” recalls Armistead. “All we had practiced was collections. So the morning of the competition we sat down with Virginia’s Terminal Velocity and studied it with them.”

Although they do not compete directly with the in-state teams, out-of-state teams also participate in the Operations Challenge at the state level. This is why MSD Flow Motion had the chance to compete in Virginia in June of 2011. “We didn’t do so hot on the pump event, that first year,” notes Armistead. “But we took what we learned and applied it once we got back to the office.”

In fact, the Virginia competition afforded MSD Flow Motion the chance not only to repeat the pump event but to also compete in the three other events that North Carolina had not included in their 2010 competition (the Virginia competition includes all five Operations Challenge events). The night before Virginia’s Operations Challenge, the equipment was set up on the tennis court of the hotel. MSD Flow Motion took the opportunity to walk through the Safety Event with one of the other teams and to exchange ideas.

“Now, we are going to rent safety equipment from different places and try to develop our own routine for how to do it,” explains Armistead.

Because of the high cost of equipment – the set-up for the pump event alone costs between $15,000 and $20,000 – MSD Flow Motion has decided to rent most of what it needs to practice for the Operations Challenge. “Once we were able to obtain the rental pump equipment, we got the process down to a fine art,” says Armistead noting that the team has been able to bring its time down from 10 to 6 minutes. Much of the first month of practice was spent trying different ways to approach the task. Once a routine was developed it was only a question of tweaking it and getting faster.

Then, just when the team members had mastered the pump event, they learned that the NC AWWA-WEA would be adding a Laboratory Event to the 2011 Operations Challenge. This time, rather than renting equipment, they decided to get creative. Instead of expensive glass filtration equipment, they used cut-off plastic pop bottles and dye to simulate samples. “It helped us practice,
but nothing makes up for the real thing,” notes Armistead. Fortunately, two months before North Carolina’s state competition, MSD Flow Motion was able to participate in a scrimmage in Union County. This gave the team an opportunity to see South Carolina’s Black Water Bruisers complete the entire lab event. Even so, Flow Motion was still beaten by Charlotte’s Grease Lightening during the lab event at the Operations Challenge on November 14, 2011 in Concord, NC. “They had more experience with the event because they had been to nationals the year before,” explains Shaun Armistead. That may indeed have been the case, but when points from all three events were tallied, it was Flow Motion that prevailed. The team from Buncombe County would be going to the national competition.

After renting the pump equipment, MSD Flow Motion has increased practices from once or twice a week to three or four times. In the lead up to WEFTEC’s 2012 Operations Challenge, held from September 30 to October 2, the team will be meeting daily.

All this practice is paying dividends. “The four of us work so well together,” says Armistead. “We all know our roles through each of the events. We also help each other. If someone is having trouble finishing their part, we all pitch in and help.”

“We make a point of yelling out what’s going on with our part,” he adds. “Communication is very important.”

Many times Brigmon will videotape a practice so that, afterwards, the team can sit down and analyze the footage. He also calls the practices and coordinates the schedule, which can be challenging because members are all on different crews. “Jason rides herd on the other three of us,” laughs Armistead. “He’s the glue that holds the team together. His competitive spirit is quite a bit higher than for the rest of us. Whenever he is working, the wheels are spinning in that head of his. He often comes into my office with a new plan.”

WEF changes one or two of the events every year so that, over the course of three years, the details of all five events are changed. For instance, last year the lab event involved an E. coli filtration. This year, it will be a biochemical oxygen demand (BOD) analysis.

“The process control and lab event provide a broader understanding of what is going on throughout the organization,” notes Michael Stamey, System Services Construction Director of the Metropolitan Sewerage District of Buncombe County. “At the same time, there are components of the safety event that can be very useful every day.”

Changing the content of each event not only helps the operators keep up with changes and trends in the industry, but also keeps the competition fresh and exciting. Certainly, there is no shortage of enthusiasm for the Operations Challenge from the members of team Flow Motion. Participating in the national competition has been their goal all along. Confirms Armistead: “All four of us are very excited. It is going to be great!”

Pipe Tapping Contest: Team Smoking Bits

In June 2012, the City of Concord’s Smoking Bits represented North Carolina in the national pipe tapping competition at the AWWA Annual Conference & Exposition (ACE) held in Dallas, Texas. The team was composed of Anthony Allman, Andy Herring, J.C. Whitley and coach Ranond Good, all from the Concord Water Treatment Plant. All four members had been
competing for a number of years, but it was the first time any of them had been to the national challenge.

“Raleigh beat us in the state competition for the past four years,” admits Allman. “But this time we were better prepared, more comfortable. You have to get your nerves calm and slow down in order to speed up.”

The Pipe Tapping Contest is a competition of skill in which water operators work against the clock to open a cement-lined ductile iron pipe and install a tap. Teams consist of a maximum of four persons, including three workers and one coach.

Every team member has a specific position and task. For the Smoking Bits, Allman is the cranker, Herring is the star man and Whitley is the copper man (returning after a brief hiatus). Working closely together, the team has to install a tapping machine on the pipe. The copper man then installs two six-foot pieces of ¾” copper piping. “He has to cut and flare them to make a complete service,” explains Allman. “He has to tie into a meter center with a ball valve in the middle. We then have to insert our piece of copper into the pipe with the tap machine. It’s pretty fast-paced.”

At the national contest in June, the Smoking Bits completed the task in 1:37, coming in 10th in a field of 28 men’s teams. (There were also six women’s teams competing against one another but North Carolina was not represented in that part of the competition.)

“It was a good experience,” says Allman. “We learned a lot by watching the other teams.” Smoking Bits – including all four of its team members – plans to use some of what they learned when they compete at NC AWWA-WEA’s Annual Conference this November. One tactic will be to ensure all tools and machines are in place and ready to use before the start of the tapping. Allman hopes that there will be more teams competing at the state level this year. In 2011, the field narrowed to two due to funding constraints. More competition makes the contest all that much more exciting.

“This is more fast-paced than anything we do out in the field,” he says. “It’s great to be involved. We all enjoy it.”

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Pilot Program for Water Pipe Bursting: Leads to Citywide Program

By Robbie Bald, P.E. City of Greensboro, North Carolina — Water Resources Department

As with most water systems, much of the City of Greensboro’s water system is more than 80 years old with the oldest infrastructure originating in the early 1900s and thereafter. The City of Greensboro is located in central North Carolina and is the third largest city in the state. The city operates and maintains a water distribution system of over 1,200 miles, with lines ranging in size from four-inch to 36-inch pipe. Because the majority of the system is comprised of ductile and cast iron, the city has relied on traditional methods of water line replacement, which becomes problematic and inconvenient in congested areas over time. As a result, the City explored other options for waterline replacement and rehabilitation in those problem areas. The pipe bursting method rose as the most viable and cost-effective alternative to traditional dig and replace construction. Some of its characteristics include:

1. static pull system (no pneumatics),
2. hydraulically operated,
3. brute force pulling,
4. roller cutter for non-fracturable pipe,
5. quick lock bursting rods,
6. two excavations requirements,
7. no vibration,
8. the ability to split both fracturable and non-fracturable, and
9. the ability to replace with high density polyethylene (hdpe), fusible polyvinyl chloride (fpvc), or other restrained joint pipe.

The Greensboro Water Resources Department contracted with a local contractor for several years to pipe-burst deteriorated gravity sewer lines with pneumatic equipment. During that period, the utility had been upgrading miles of old four-inch cast iron water distribution lines by traditional open-cut replacement. The ability of static pipe bursting machines to install multiple product pipe options presented the utility with an opportunity to move into water main pipe bursting in lieu of open-cut replacement.

The first demonstration of pipe bursting was a small water line replacement project that occurred in an affluent residential area where a 1,200 feet, four-inch cast iron water line was replaced by a six-inch fusible polyvinyl chloride (FPVC) pipe as an example of the new method.
shown in Figure 1. Among a host of advantages, FPVC pipe offers more control in the heating, fusing and cooling cycles of prepping the pipe for installation, giving a greater degree of confidence in the product. The application of this type of pipe for the selected area included several factors such as (1) low traffic, (2) minimal number of service connections, (3) a nearby park to stage construction, (4) smaller diameter pipe, and (5) relatively short length to replacement.

Pipe manufacturers typically provide fusing services as a part of supplying their product. For this installation, the pipe manufacturing company was subcontracted to perform the work. The company trained and certified the city’s contractor, KRG Utility, Inc. on the project. KRG is now one of four utility contractors in the southeast certified to fuse PVC pipe.

The previous project led the city to the next installation of a four-inch fusible PVC pipe through directional drilling along Wendover Avenue to enable the transfer of services from the existing location under the roadway and allow for the pipe bursting of a 12-inch cast iron water transmission line, which was originally installed in 1929. The 12-inch line was replaced with 12-inch restrained joint ductile iron pipe. Figure 2 portrays the magnitude of the failure that led to this project. Figure 3 depicts the fractured pipe that led to the roadway collapse.

In conclusion, the pilot project and the Wendover Avenue pipe bursting project both proved that pipe bursting is not only a viable alternative for water line replacement for the City of Greensboro, but is also highly beneficial. The Greensboro City Council approved the Water Resources Department budget for fiscal year 2009/10, which included a major expansion of the city’s rehabilitation program to include pipe bursting of substandard waterlines. Other beneficial observations included the following:
1. Traditional dig and replace construction was initially estimated to cost at least $1.3 million for the Wendover project. The pipe bursting project actual cost was $770,000, a savings of approximately $500,000.
2. Traditional dig and replace construction initially had an estimated construction schedule of six months. The pipe bursting project was completed over a course of three four-day weekends, working 24 hours each day in 12-hour shifts.
3. Construction was completed without causing massive delays on Greensboro’s busiest roadways and without a single public complaint.
4. The use of fusible PVC and ductile iron for pipe bursting was highly effective.

These projects demonstrated high levels of cooperation between the water utility, pipe manufacturer and trenchless equipment producer to develop a municipal pipe bursting program. These examples serve as a model for other utilities in terms of an approach to developing achievable solutions for rehabilitation and replacement projects.

ABOUT THE AUTHOR:
Robbie Bald has been employed with the City of Greensboro for over 25 years and has been a licensed civil engineer for more than five years. His primary duties surround the coordination and efficiency of rehabilitating waterlines. Robbie loves working for the Water Resources Department and makes every attempt to share his on-the-job experiences with colleagues. He is an avid public speaker in the community and actively serves on several committees and organizations.

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As budgets are tightened and funding is reduced in both public and private sectors – due to the recent downturn in the economy – our future approach to managing and replacing aging infrastructure is challenged. It is clear that we need to find more cost effective and innovative ways to replace and sometimes prolong our existing infrastructure. This particular issue features and explores assessment methodologies, innovations in infrastructure and facility rehabilitation/replacement, and cost effective ways to improve the life of our infrastructure. As water and wastewater professionals, we need to concentrate on developing good/sound strategic and capital improvement planning, that encompass investigating existing conditions and the overall repair/replacement status of our aging infrastructure, while comparing our proposed infrastructure action plans and/or remedy approaches to ones in neighboring municipalities; and thereby, determine the best possible plan and/or approach, technologies, and management tools that will resolve our aging infrastructure dilemma within a prescribed time frame and established budget.
Dams are a unique component of our water supply system because, if they are not properly maintained or upgraded to meet current regulatory criteria, they could potentially pose a hazard to downstream communities. In 2009, the American Society of Civil Engineers gave dams a D rating in their Report Card for America’s Infrastructure and noted little money from the economic stimulus bill was devoted to dam or levee repairs. More than 1,800 dams are classified nationally, as deficient or ‘high-hazard’ dams, meaning that their failure could likely result in loss of life. The fragility of North Carolina’s aging water supply dams is becoming increasingly evident as the state continues to grow in population and land for new dams becomes scarce. Due to a prolonged economic downturn, it has become more and more difficult to appropriate sufficient funding for many of the 552 municipalities and 100 counties, so that they can adequately maintain or upgrade dams. In addition, as North Carolina continues to grow, we place an increased reliance upon the available capacity of our water supply reservoirs. New dams are becoming increasingly difficult to permit, so the importance of maintaining and upgrading our existing water supply dams has become paramount.

As dams age, the need to perform routine maintenance is vital. Earthen dams typically require repairs to address deteriorated filters and drains, tree removal, slope erosion repair, and the re-establishment of adequate vegetation. Conduits and other penetrations through dams are particularly susceptible to long term seepage and possible internal erosion issues. Corrugated metal pipes installed on many older dams for drains or conduits require replacement after 15 to 20 years of service. Concrete dams often suffer from miscellaneous concrete deficiencies, including cracks, spalls, abrasion, or freeze-thaw damage. Similarly, deterioration of spillways, outlet works, gates, trash racks, and other ancillary items require attention throughout their service life. Degradation of concrete dams due to alkali silica reactivity (ASR) is an especially challenging problem. This chemical reaction between alkalis in the cement and silica can cause internal expansion in the presence of water, thus exacerbating cracking and concrete deterioration.

A robust system of routine inspection, operation, and maintenance activities to proactively address minor items can reduce the expense of rehabilitation projects. For example, if gates are routinely greased, operated and maintained, their service life can be extended for decades. However, if gates are left unattended for several years, the gates could seize, and require expensive repair or replacement. Similarly, minor repairs to spillway joints, sealants, filters, drains, and engineered energy dissipaters reduces the development of larger problems that may require costly extensive repairs or complete replacement of such items.

As an example, the City of High Point has implemented an annual dam safety inspection program of their two high hazard water supply dams, City Lake and Oak Hollow, and four regional storm water dams, to identify any developing dam safety or performance related issues. The inspections are performed by an outside consultant in conjunction with the City’s operational staff to complement the City’s long term operation and maintenance program. Numerous items have been addressed as a result of these inspections, including concrete and joint repairs in the spillways, gate and valve operations and maintenance, tree and vegetation removal, seepage monitoring, and instrumentation adjustments. In addition, long term issues are monitored on a routine basis by experienced personnel to consider adverse trends that may lead to developing problems.

In addition to service life deterioration, older dams might not be compliant with current dam safety criteria, as regulated by the North Carolina Department of Environment and Natural Resources (NCDENR), Land Quality Section, Office of Dam Safety. The most common regulatory issues are an insufficient spillway capacity for the mandated design storm and/or the factor of safety below minimum requirements for global stability of concrete dams or slope stability of earthen dams. Many of North Carolina’s older dams were built prior to the establishment of the 1967 dam safety program in North Carolina. NCDENR established minimum design storm requirements for dams that are based on the hazard classification, height of the dam, and storage volume. High hazard dams, which have the potential to cause loss of life, are required to convey larger storms events than low hazard dams. Sometimes, a low hazard dam originally built in a rural area may need to be re-classified as high hazard due to the later development of homes and businesses located downstream of the dam.

The breadth of devastation caused by a dam failure can be far-reaching. The cost to replace the actual failed dam is often a very small portion of the total damage expense, which includes the cost of downstream property, environmental damage, and loss of public confidence. A failure of a water supply reservoir can result in lost property, environmental damage, and loss of public confidence. A failure of a water supply dam can result in lost property, environmental damage, and loss of public confidence.
supply dam can result in the loss of the water resource that may pose a significant threat to the surrounding community. In 2010, the Lake Delhi dam, about 45 miles north of Cedar Rapids, Iowa, failed due to a significant amount of rainfall that overwhelmed the spillway and overtopped the earthen embankment. According to an independent panel of engineers, a combination of overtopping and internal erosion caused the embankment to fail, sending a massive amount of water into nearby communities and forcing evacuation of roughly 8,000 residents. The total cost of dam failures is not typically published, however the cost of even small dam failures can be in the millions. The estimated cost of replacement of the Lake Delhi dam was $12 million, not including any downstream damage or clean-up.

Major dam rehabilitation can be extremely challenging due to complexities related to subsurface conditions. It is necessary to understand the local geology, geotechnical issues and groundwater conditions and how they impact the performance of a dam. Similarly, a depth of experience is required to adequately address hydraulic, mechanical, and structural issues related to the performance of a dam. Dewatering and temporary conveyance systems during construction of a dam pose considerable complications and risk to engineers, owners and contractors. Providing adequate protection to reduce the risk of flooding during construction and distributing the risk appropriately is a balancing act. Frequently, dams have multiple deficiencies that need to be addressed. Proper diagnosis of a suite of issues, how they are interrelated, and how to efficiently implement solutions to provide a safe and reliable dam requires a design expert.

A good example of this is the Linville Dam for the Linville Land Harbor community in Avery County, North Carolina. The Linville Dam was previously at the top of the state’s list of deficient high hazard dams. A diagnosis of the deteriorating gated spillway revealed that the concrete had severe ASR, and the radial gates were structurally deficient, making rehabilitation of the existing spillway economically infeasible. Numerous innovative solutions were implemented to address various deficiencies that produced an economical, safe and reliable design. One innovation was a labyrinth spillway crest design, consisting of a long fixed crest weir that is zigzag to provide a large weir length within the truncated footprint. Given the proper dimensions and approach conditions, this spillway is extremely efficient hydraulically, and reduced the size and cost of large spillway slabs and energy dissipaters usually required by long straight weirs. Grouting and pretreatment of the foundation reduced the potential for concentrated seepage through discontinuities in the rock.

The aging of our country’s dams is a fundamental problem that is often ignored until there is a catastrophic disaster. At a time when dollars are scarce, it is understandable that owners are finding it difficult to meet the needs of their capital improvement plans across the board. However, routine maintenance, inspection, and evaluation of dams can improve the operation, lifespan and safety of these important structures. When significant issues that affect the integrity of a structure and public safety are evident, it is important to retain experienced engineers to provide innovative solutions to these complex problems at a minimal cost, but certainly not at the expense of dam safety.

About the Authors
Thomas Fitzgerald, P.E. is a Senior Associate in the Greensboro office of Schnabel Engineering as head of the design group. Tom has 16 years of experience almost entirely devoted to the evaluation, design and construction of new and existing dams. Mark Landis, P.E., P.G. is a Principal in the Greensboro office of Schnabel Engineering. Mark has over 27 years of geologic, geotechnical, and dam design experience and is currently the project manager and proposed engineer of record for the new 150-foot-high pump storage at Cobbs Creek Dam for Henrico County, Virginia.

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In 2007, Asheville’s mayor Terry Bellamy spearheaded the City Council’s commitment to make significant investments in the city’s aging water infrastructure and ensure that its customers will have reliable drinking water following the Council’s approval of $40 million in revenue bonds to fund numerous, critical projects increasing the reliability of the distribution system.

Background
The City of Asheville Water Resources Department provides an average of approximately 20 million gallons per day (mgd) of high quality water to over 125,000 residents in Asheville, Buncombe and Henderson Counties. The water production system consists of three water treatment plants (WTPs) providing a total treatment capacity of 43.5 mgd. 40 pumping stations to boost water pressure to higher elevations, 32 storage reservoirs and more than 1,660 miles of distribution pipelines in mountainous topography. The city leverages the topography to reduce pumping costs – with more than 80% of the treated water fed to the distribution system by gravity from two direct filtration plants, the North Fork and DeBruhl WTPs. These direct filtration plants treat water from impoundments located on 22,000 acres of protected mountain forests owned and managed by the Department. The city’s mountain source water is one of the highest water quality supplies in the country, and has been used to supply the region for over 100 years. The secondary source of water is the Mills River WTP, which was put into operation in late 1999 in response to growing demand and the need to expand water service to Western Buncombe and Eastern Henderson Counties.

Asset Management Program

The Water Resources Department hired Brown and Caldwell in 2002 and began its implementation of an asset management program in response to growing capital needs, limited funding and regulatory pressure to improve treatment effectiveness. The asset management program incorporated best practices into its asset planning and maintenance activities while focusing
Its limited resources of staff, time and money. The city continued to make significant investments in the water infrastructure and established a capital improvement program fee to fund its planned reinvestment efforts in its aging infrastructure.

This multi-faceted program included the following elements:

- Establishment of best management practices for optimizing maintenance, refurbishment and replacement in order to reduce life cycle cost of asset ownership;
- Implementation of a Maximo-based computerized maintenance management system (CMMS) that includes a full inventory of water production and distribution system assets and facilitates optimized maintenance;
- Establishment of a rigorous capital improvement program (CIP) including conducting business case evaluations of complex projects to ensure the optimum solutions are implemented;
- Development of a Replacement Planning Model (RPM) that establishes funding needs for sustaining aging infrastructure; and
- Implementation of an asset management information system that facilitates enhanced decision-making on asset refurbishment and replacement based on asset age, condition and maintenance history.

**Bond Projects**

With Mayor Bellamy’s leadership, the City Council approved a $40 million revenue bond in early 2007 to construct several of the highest priority projects the Water Resources Department had identified from the asset management plan. The projects included in the bond package were chosen due to the age and condition of the pipelines, a history of maintenance issues, or to address a lack of service and/or fire protection in some areas of the distribution system. Some projects replaced lines that had been in service for over 100 years.

In order to quickly address these issues, the projects were broken out into four separate contracts, with several designs in each project package. Engineering firms were selected in June 2007. Awarded to Brown and Caldwell, Cavanaugh & Associates, CDM Smith, and McGill & Associates, the engineering contracts included design, permitting, bidding and construction administration services for each identified project. The designs for all of the projects were completed by September 2007 and construction began in early 2008. The Water Resources Department had four project managers and at least ten staff members involved in the concurrent, fast-paced management, administration, design review and inspection of the bond projects. In comparison to these accelerated schedules, the city’s typical timeline for a project is about two months for consultant selection; it is six to eight months for design and review of a project of this size/scope and another two months for bidding and award.

**Brown and Caldwell Projects**

Brown and Caldwell designed and administered construction of four projects:

- Bee Tree Junction is a central node along the 24- and 36-inch water transmission mains between the North Fork Water Treatment Plant and the Bee Tree Water Treatment Plant and Haw Creek Junction. Over 80 percent of the city’s total demand depends on this junction for transmission to customers. Through previous analysis by Brown and Caldwell, the City identified Bee Tree Junction as needing improved reliability, added redundancy, reduced vulnerability of failure, and improved maintenance access. The

![Figure 2: Bee Tree Junction before (top) and after (bottom) the improvements.](image)
improvements included a series of interconnects between the existing 16, 24 and 36-inch water mains as well as a 24-inch bypass around the entire existing facility in case of local pipe system failure.

- The Beaucatcher/White Fawn 24-inch Water Line replaced an 80-year old existing 24-inch water main with a new pipeline through a rapidly developing area. The White Fawn Junction is atop Beaucatcher Mountain and is the main distribution line to the hospital district along Biltmore Avenue and to the population on the west side of the City. The line distributes water produced at both the North Fork WTP and the Bee Tree WTP and had to remain in service during the construction of the new, parallel pipeline.

- The Weston Road Water System Improvements was designed to provide reliable water service to the Weston Road Service Area while decreasing the demand on the stressed South Buncombe Pump Station/Concord Ground Storage Reservoir system. The improvements consisted of constructing a new booster pumping station that included four vertical turbine pumps and 12-inch water line, which was supplied directly by the Mills River WTP distribution system.

- The upgrades valve installation program provided additional flexibility in the distribution system for flushing and isolation during repairs. The design included the installation of 35 new valves and one replacement valve. Due to the number of sites and the accelerated schedule of the project, design documents were created utilizing GIS data provided by Water Resources Department staff along with the Buncombe County GIS Department, rather than traditional survey. Live line-stop technologies (Hydra-stop™) were used to isolate certain valves identified by Asheville staff to minimize water interruptions in critical areas. Also, a unique thrust block system was designed to ensure pipe joint separation would not occur during opening and closing of each valve because of the high average system pressures.

Cavanaugh & Associates Projects
The Cavanaugh & Associates projects included the Wood Avenue and West Asheville Areas 1-4 projects. The projects consisted of 34,000 linear feet of replacement and upgrades of existing small diameter lines ranging from six inches to 16 inches. Some lines were extended to cover the entire residential street or connect a loop in the distribution system to avoid dead ends. Cavanaugh conducted monthly meetings with the city's engineers to assure careful coordination so that the design was completed ahead of schedule to meet the funding requirements.

Cavanaugh also provided assistance with providing back-up power generators at several booster pumping stations and at the Mills River Treatment Plant to insure continuous delivery of the water supply to customers. This included over 35 booster pumping stations, some of which presented significant challenges from site and topography constraints. In many instances, retaining walls were required. While distribution lines are ‘out of sight and mind,’ generators are highly visible at the ground surface. This presented challenges regarding aesthetics in the communities that house some of the booster stations. Close coordination with community representatives, Homeowner Associations and Property Owner Associations (HOA/POA) were required for the successful completion of the project. Other challenges included damage to one installed generator by a stray vehicle from the right-of-way.

Throughout the project there was close coordination between city staff and the project team, which provided a successful working environment.

CDM Smith Projects
CDM Smith designed the Central Business District and Town Mountain projects that required a compressed schedule of designing $12.5 million of improvements in a period of three months from survey delivery to final plan production in order to meet the city's bond funding goals. Because the majority of the improvements were located within the historic downtown area of Asheville, significant coordination with existing utilities, previous city streetscape and beautification projects, and the downtown business community was required.

The Central Business District project replaced 100-year old service lines, including a new pipe at the Tunnel Road tunnel, with:
- approximately 9,100 feet of 24-inch water main,
- approximately 9,500 feet of 8- to 16-inch water main,
- approximately 1,100 feet of 10-inch
The Town Mountain project consisted of:
- demolition of a 500,000-gallon ground storage tank and associated, complex bypass pumping and controls to maintain water to the service area;
- a new 250,000-gallon pre-stressed concrete storage tan;
- a 400-gpm booster pump station, yard piping, and associated appurtenances; and
- approximately 1,300 feet of 12-inch high-pressure water main.

McGill & Associates Projects
McGill & Associates designed three revenue bond projects:
- The Hendersonville Road project included the construction of 22,100 linear feet of a new 24-inch water line along Hendersonville Road (US-25) to replace an undersized and aged water line that had numerous leaks and repairs. The new 24-inch line increased the efficiency of the distribution system in the area and improved system reliability. Due to high volumes of traffic on US-25, the majority of the improvements were performed between 7:00 pm and 6:00 am.
- The Brevard/Clayton Road project consisted of the installation of 22,100 linear feet of new 24-inch water line along these roads to replace an old, leaky 6- and 8-inch water line. The project also improved the hydraulic efficiency of the distribution system in the area.
- The Royal Pines project replaced 38,600 linear feet of aging, leaking lines with new 6- and 8-inch water lines. During the project all existing water meter services were connected to the new water lines and the old lines were abandoned.

Completion of Bond Projects
The Water Resources Department issued final completion of the last, ongoing bond project in early 2011 on the Haw Creek pumping station and Town Mountain storage tank.

“The city’s commitment to upgrade aging infrastructure and to ensure reliable water services through the revenue bond project has allowed us to make an enormous amount of progress in a short amount of time,” stated Chad Pierce, Manager of Engineering Services.

While several projects identified in the Asset Management Plan were completed in this focused effort, the Department has scheduled additional major capital projects in the upcoming years.

Large Diameter Water Transmission Line Evaluation
The Water Resources Department is currently focusing on two of the most important assets in its system, the 50- and 100-year old parallel water mains from the North Fork Water Treatment Plant (WTP) to the Haw Creek Junction that carry over 80% of the water supply to the distribution area. Accurate locations and conditions of these assets are not completely defined and present a risk in terms of long-term maintenance, protection, and reliability. Development has encroached into the pipeline easements, presenting
both an increased consequence of failure due to potential loss of life and property and a challenge to the physical access.

The objective of the ongoing project is to increase the reliability of the critical transmission mains and includes inspection and analysis of the following:

- 67,500 LF of 36-inch steel pipe,
- 31,400 LF of 24-inch cast iron pipe, and
- 700 LF of 36-inch precast concrete cylinder pipe.

The systematic approach to locating and assessing the condition is by performing internal inspections while keeping the lines in-service and recommending a plan of improvements that will sustainably safeguard the mains for years to come. This approach also includes internal closed-circuit television (CCTV) with the line in service, survey, leak detection and detailed structural condition and corrosion analyses. This information will then be used to develop a long-term plan for protection, refurbishment and replacement including funding.

Brown and Caldwell and city staff just completed the first phase of the project that included locating the transmission mains, collecting data on the features, documenting encroachments, and assessing the external condition of the mains.

The City of Asheville’s Water Resources Department continues to follow its clean in place (CIP) process using sound asset management processes and proceeding with prioritizing and funding the identified work to sustain its water system.

ABOUT THE AUTHORS:
Leslie Jones is a Senior Engineer and works in the Charlotte, NC office of Brown and Caldwell.

Chad Pierce is Engineering Services Manager for the City of Asheville’s Water Resources Department.

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A Profile Of Sewer System Rehabilitation In Concord, North Carolina

By James (Scott) Scotland Cox, City of Concord

Synopsis:
The City of Concord selected 'cured-in-place-pipe' (CIPP) as the best technology to meet the needs of a declining sewer system within project constraints. CIPP offered Concord the most cost-effective, customer-friendly and environmentally conscious means to extend the life expectancy of the aging sewer system.

Most municipalities have the same question, “How are we going to fix this failing sewer line?” Prior to 1971, the only option for sewer rehabilitation was traditional replacement of the existing sewer mains by typical construction methods. Now, more options are readily available to municipal system operators.

In 2004, the City of Concord began to explore options for either rehabilitation or replacement of its aging system. The City evaluated alternatives using several criteria, including cost, life expectancy of the product, the sewer main’s flow capacity, impact on the environment, and service disruption. The City compared three alternatives: traditional replacement of the existing sewer system with new infrastructure, cured-in-place-pipe (CIPP), and pipe bursting. With these factors, the City determined that the best solution for rehabilitating the aging system was cured-in-place-pipe.

CIPP DEFINED
Since its development in 1971, cured-in-place-pipe (CIPP) has become the front-runner in trenchless technology and pipeline rehabilitation. CIPP has provided effective solutions to the major issues impacting our industry today: cost, life of product, installation time, and environmentalfriendliness. Cured-in-place-pipe (CIPP) is defined as a trenchless technology using a “resin-imregnated flexible tube that is either inverted or pulled into the original pipeline/conduit and expanded to fit tightly against said pipeline by the use of water or air pressure” (NASSCO 2012). By elevating the temperature of the water or air used for the inflation, the initiators cause a thermosetting reaction, which cures the resin.

CIPP BENEFITS
CIPP offered many structural benefits by eliminating infiltration and exfiltration from the existing piping. It also restored the structural integrity to the existing piping, eliminated joints, sealed off root intrusion and leaks, and was suitable for irregularly shaped pipes and changes in pipe diameter. Additionally, it offered protection from corrosion and reduced the time and cost of maintenance. CIPP also offered some environmental benefits such as minimal impact to street traffic, and prevention of sinkholes and surface settlement. The process also avoids the consequences of open-cut roadways, such as sediment runoff from the disturbed areas polluting streams and rivers.

“The expected life is projected to be 50 to 100 years for many CIPP lining technologies; this information can be found on most CIPP product web sites. On what basis are these claims made, since none of the products have been installed in sewer applications for 100 years? Products are typically tested by the manufacturer and independent laboratories” (Muenchmeyer, P.E. 2007). CIPP will add a minimum of 50 years of life to the existing infrastructure, which is comparable to the life expectancy when replacing the infrastructure. A major advantage of CIPP is the reduced installation time and minimized service disruption for customers.

CIPP INSTALLATION
Cured-in-place-pipe (CIPP) installation reforms the existing pipe interior. There are two methods of installing the tube liner into the existing pipe, through either inversion or pulling.

‘Inversion’ uses water or air to push the tube liner through the length of the pipe. Whereas, ‘pulling’ utilizes ropes, winches or other devices to drag the tube liner through the length of existing pipe.

Once the tube is installed to the desired length, the tube is inflated with either hot water or steam (often referred to as water curing or steam curing). The actual temperature of the water or steam varies in accordance with the diameter of the existing pipe, and the thickness and resin attributes of the tube liner. For example, for an eight-inch diameter clay pipe, the average liner thickness was 6.0 mm with an average curing temperature of 200 degrees Fahrenheit at 12 psi.

While the method of curing the pipe should be specified by each customer, the City of Concord employed the steam curing method because it utilized a mobile source of water and the liner pressure was more consistent and controlled. Additionally, water curing presented a few problems.
for the City. The water curing method was dependent on a continual on-site water source with a constant pressure. Within older neighborhoods, the continual draw of water from the existing water systems created tuberculation issues. Also, the tube liners would develop minor ruptures or the existing pipe would be unable to support the loading and collapse, creating bulges and thereby causing a curing failure.

After the liner has been successfully cured and cooled, the service connections are reinstated by using closed circuit TV (CCTV) equipment and air-driven cutters. The end product should be a jointless, seamless pipe-within-a-pipe that protects against spills, breaks, and pipeline leakage.

**BENEFIT TO THE CITY OF CONCORD**

In consideration of today’s economic climate, the City of Concord is committed to repairing or replacing aging sewer system infrastructure in innovative ways. In 2012, the City lined approximately 20,000 linear feet of sanitary sewer pipe at an estimated cost of $30 per linear foot. Comparatively, an estimated cost of $100 per linear foot would have been necessary to replace the same length of pipe, not including other appurtenances needed to complete the scope of work. Since 2005 the City of Concord has lined approximately 65,000 linear feet of aging sewer pipe (or about 12 miles) and saved over $950,000 through the use of the CIPP technology. The CIPP technology provided a way for the City to extend the life of the existing sewer system at a substantially lower cost than traditional replacement.

**HISTORIC DISTRICT PROJECT**

CIPP technology has not only made a tremendous impact on saving money in the City’s budget, but also provided a customer-friendly and environmentally conscientious means to rehabilitate sewer infrastructure.

For example, the 2011 CIPP contract area on Georgia Street NW was located within a historic district in downtown Con-
This neighborhood had protected historic trees, lush manicured landscapes, historic brick drives, and various active and abandoned utilities. Because of this area’s historical value, tree removal and extensive excavation were not options.

On March 30, 2012, the City of Concord's contractor lined approximately 830 linear feet of eight-inch clay pipe within Georgia Street NW at an approximate cost of $30,000. This section of line took approximately five hours to install and cure, and another two hours to reinstall service taps for a total of seven hours of service disruption to the affected customers. Considering the project’s duration, cost, and the added life expectancy of the infrastructure, the cost-effectiveness of this rehabilitation project was tremendous.

Compared to traditional replacement, the same 830 linear feet of pipe would have cost approximately $62,000 for material, and would have required approximately 30 days to construct.

This replacement cost does not include other areas of construction like pavement removal and replacement, landscaping replacement, and service reconnection, which could add an additional $125,000 to the project. With a typical sewer replacement, the disruption for the neighborhood would be about 29 days longer at a tremendously higher cost than the CIPP rehabilitation.

CONCLUSION
After extensive research, product comparisons, and 10 years of CIPP sewer rehabilitation success, the City of Concord has identified the best method to rehabilitate declining sewer infrastructure while staying within project constraints. As the City strives to maintain and remedy the aging system, the City will continue to honor its commitment to customers to be good stewards of public resources. This commitment does not focus on making profits, but rather considers protecting the public’s investment and ensuring a safe and healthy community for future generations.

SOURCES:


ABOUT THE AUTHOR:
James (Scott) Scotland Cox is presently employed with the City of Concord Engineering Department as Construction Inspector. Mr. Cox has a total of 20 years of experience in water distribution and wastewater collection system operations, maintenance, and construction with the City of Kannapolis and the City of Concord. Mr. Cox has a grade C distribution certification for water treatment facility operators, a grade 1 for water pollution control system operators, and recently obtained the 2011 NASCO CIPP Inspector certification.

“After extensive research, product comparisons, and 10 years of CIPP sewer rehabilitation success, the City of Concord has identified the best method to rehabilitate declining sewer infrastructure while staying within project constraints.”
Conventional Sanitary Sewer Evaluation and Rehabilitation is Effective…but is it Efficient? Maybe there is a better way…

By Marco R. Menendez, P.E./Dewberry

Over the past 20 years there have been great strides in technologies associated with sanitary sewer evaluation and rehabilitation. Many municipalities have realized the benefits associated with these advances by effectively locating problems in the sanitary sewer system, determining the proper order of implementing improvements to the sanitary sewer system ( prioritization), and understanding the best rehabilitation or replacement method to implement. While the conventional process of evaluation, prioritization, design, and construction is effective in correcting sanitary sewer deficiencies, is it efficient? In the midst of widespread municipal budget challenges, is the money dedicated to sewer rehabilitation being spent wisely, and in a manner that provides the best return on investment?

The Inefficiencies of Conventional Methods

Many municipalities have taken steps to alleviate the current and potential problems associated with their sanitary sewer systems. Some of these municipalities have utilized consultants to complete comprehensive infiltration and inflow studies, or sanitary sewer evaluation surveys (SSES). While these planning studies can provide valuable information, there can be some inefficiency associated with these methods of evaluation. First, there is much effort expended and money spent developing a report with information that may become outdated or simply not utilized in the future. While it is important to understand the location of system deficiencies in order to prioritize the areas of focus, this can be accomplished with historical knowledge of the system (e.g. sanitary sewer overflow locations), or with a simplified inflow and infiltration study with flow monitoring and possible smoke testing. Secondly, the conventional process is disjointed, with potentially numerous entities at various times completing the evaluation, design, and construction. This leads to inefficiencies due to the inherent ‘slow down’ and ‘ramp up’ cycle with this process. Additionally, the benefits of collaboration are not achieved due to the lack of connection and/or collaboration between the different entities involved.
‘Find and Fix’ Sewer Rehabilitation Benefits:
An Efficient, Cost-Effective Process

Some North Carolina municipalities have begun to realize the benefits of a ‘find and fix’ sanitary sewer rehabilitation program, especially since there is a strong need to rehabilitate sanitary sewer systems in both large and small systems with very limited funding. The purpose of ‘find and fix’ is to eliminate the inefficiencies associated with conventional sewer evaluation and rehabilitation methods and achieve the best return on investment in a shorter time period. With ‘find and fix,’ if there is enough historical information (flow monitoring data, SSO information, etc.), an experienced consultant can have sewer rehabilitation specifications out to bid within two to three weeks after the notice-to-proceed has been issued.

Once the construction contract begins, the engineer directs the contractor to focus on a particular portion of the sewer system. The contractor then cleans and TVs the pipeline, and provides the video to the engineer for review. The engineer then evaluates the video, and provides a rehabilitation (or replacement) recommendation. There is no ‘one-size-fits-all’ sewer rehabilitation method. There are times when the engineer will collaborate with the contractor to determine the best sewer rehabilitation method. This kind of collaboration, utilizing the knowledge of the engineer supplemented with the knowledge of the contractor can prove invaluable. However, this collaboration cannot be effectively achieved through traditional methods of sewer evaluation and rehabilitation.

With the ongoing budget constraints that many municipalities/utilities are facing, combined with the continuing need to address aging sanitary sewer infrastructure, ‘find and fix’ sewer rehabilitation is proving to be an effective means to fix the right things, the right way, in a quick and cost-effective manner.

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Rehabilitation of existing infrastructure is a cost-effective means of improving the efficiency and reliability of a public utility’s assets. With a rehabilitation project, extra care must be taken during the design phase to fully document the existing conditions, and close coordination is needed during construction to avoid or limit service disruptions. By choosing rehabilitation rather than replacement, components can sometimes be repaired and reused, thereby avoiding the need for demolition and then reconstruction. Furthermore, rehabilitation offers the owner the opportunity to make improvements and standardize the entire system.

The Public Works Commission (PWC) of the City of Fayetteville is in the midst of renovating three of its wastewater lift stations. One project has been completed, and the other two lift stations are in construction.

Overview of PWC
The City of Fayetteville’s Public Works Commission (PWC) was created on March 4, 1905, through an act of the state legislature, to manage, operate, and supervise the three utilities - electric, water, and sanitary sewer, as well as to be responsible for operating the city market stalls, and to test weights and measures. Over 100 years later, the PWC is publicly owned, locally operated and governed by a Board of Commissioners appointed by the Fayetteville City Council. The Board consists of four members who serve four-year staggered terms.

Today, the population served by the PWC Water System is nearly 200,000, made up of 76,108 residential, 6,454 commercial and nine industrial users. The PWC system also supplies drinking water for neighboring systems, including the Fort Bragg Military Base (FBMB), the Town of Spring Lake, the Hoke County Regional Water System, the Town of Stedman, and a multiple private systems throughout Cumberland County. Water supply for the FBMB and the Town of Spring Lake is shared with the Harnett County Water System.

The water system is supplied by the P.O. Hoffer and Glenville Lake Water Treatment Facilities that have a combined treatment capacity of 57.50 MGD. The Cape Fear River and the Glenville Lake watershed are the primary raw water supply sources.

The PWC wastewater system is divided into two primary service areas. The Rockfish Creek Basin and the Cross Creek Basin systems operate completely independently, each with its own treatment facility. Both water reclamation facilities discharge to the Cape Fear River and have a combined permitted capacity of 46 MGD. Biosolids are recycled over 5,000 acres of Cumberland County farmland, including a 750-acre farm owned by PWC. The wastewater collection system consists of approximately 1,900 miles of gravity mains and over 70 miles of sewer force mains.

The estimated population served by the wastewater system is approximately 181,000, which includes service to 71,400 residential, 5,000 commercial and 11 industrial customers. The PWC accepts, transports and treats wastewater from neighboring systems, including Hoke County, the Town of Stedman and the Northern Cumberland Regional Sewer System (NORCRESS), which is comprised of the Towns of Wade, Godwin and Falcon located in eastern Cumberland County.
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In addition to providing water and wastewater utilities, PWC has the largest municipally-owned electric system in North Carolina. Electrical power is generated by the Butler-Warner Generation Plant. The plant is a combined-cycle steam plant and has a generation capacity of 265 megawatts (MW), making it the largest municipally-owned power plant in the state.

Purpose and Need
The Public Works Commission (PWC) has approximately 90 lift stations with varying flow capacities, ranging from 1440 gallons per day (gpd) to 1.9 million gallons per day (MGD). PWC identified three lift stations (LS) for immediate rehabilitation, LS #9, LS #66 and LS #69. The renovation goals are to replace aging equipment, maintain continuity of service, reduce confined-space entry, and to bring the pump stations up to PWC standards.

Improvements Made
Lift Station #9, also known as Deep Creek, is a dry-pit suction lift pump station with a firm pumping capacity of 1.5 MGD. The station became operational in 1970 and has over 40 years of service. The three existing pumps are to be removed, and replaced with two new pumps, and a blind flange will be installed at the third pump connection. In addition to new pumping equipment, new piping, valves, controls, electrical equipment and HVAC are to be provided. In order to improve access to the pumping level, the existing metal stairs will be replaced with alternative tread (Lapeyre) stairs. Three new steel beams will be added to support the overhead discharge piping. The existing 125 kilowatt (KW) generator and transfer switch will remain in service.

Lift Station #66 (LS #66), also known as Hunting Ridge, is a submersible pump station that began operating in 1993. Improvements to this lift station will include replacing the pumps with 2 ½” discharge grinder pumps, new lift rails, discharge piping, float switches, and a control panel. The improvement project will also include a new upper riser section, a new top slab with aluminum access hatch, and screened vent. A valve vault has been installed to accommodate new check and gate valves that are located within the discharge piping. The LS #66 rehabilitation designs were completed by PWC.

Lift Station #69 (LS #69), also known as The Cove, is a suction lift pump station that PWC inherited from a subdivision developer. LS #69 was placed into service in 1994 and is comprised of two dry-pit suction lift pumps. The existing pumps were set below grade, therefore requiring a confined-space entry whenever PWC maintenance staff needed to access the pumps. Because of confined-space entry requirements, a minimum of two employees had to be present during any service call. The new pumps will be raised approximately seven feet and installed at grade level. A new precast 12-ft x 16-ft enclosure will protect the pumps from the weather and provide space for the new electrical and control panels. The precast enclosure has a simulated brick finish that will blend in with the houses in the neighborhood. In addition to new pumps, the lift station improvements will include new valves, piping float switches and ventilation. A new one-inch water service will provide water for future lift station cleaning and maintenance. Also, the existing force main will be replaced with a new four-inch force main that will be located within the existing 30-ft utility easement.

Design Phase
Woolpert, PLLC of North Carolina (Woolpert) provided design services for Lift Stations #9 and #69. Record drawings were not available for LS #9 Deep Creek. During the design process, Woolpert retained the services of 4D Site Solutions to field-dimension the existing structure and appurtenances. These were then compared to photographs taken by the design team, and adjustments made where necessary. Flow records maintained by PWC confirmed that the existing lift stations had adequate reserve capacity and additional capacity was not required.

The record drawings for LS #69 were used in conjunction with field observations to establish the design base.
Construction
Woolpert retained Robinson Water PLLC to provide construction phase services for this project. Construction began with notice to proceed effective April 30, 2012 and all work is to be completed by October 27, 2012.

The Role of the Engineer during Construction
The construction phase services engineer provides a vital link between the construction contractor and the designer of the project. The engineer can also serve as an impartial arbitrator between the owner and the contractor, if needed.

The engineer conducts a preconstruction conference that lays the groundwork for the construction phase of the project. The preconstruction conference serves as a transition between the competitive bidding process and the actual construction. It is also an opportunity to reinforce the roles of the owner, the engineer and the contractor.

The construction phase services engineer can also coordinate the review of shop drawings and other submittals during construction. The engineer conducts monthly progress meetings to review the overall progress of the work, help identify and resolve potential construction conflicts, and review contractor progress payment. The construction phase services engineer also facilitates requests for information (RFI) from the field, and work change directives (WCD). Finally, the construction phase engineer can assist with preparation of project certification and the warranty inspection. •

ABOUT THE AUTHORS
Joe Robinson, P.E. is the President and Founder of Robinson Water PLLC.
Vance McGougan, P.E. is a Water Resources Engineer with the Public Works Commission of the City of Fayetteville.
Paul Smith, P.E. is a Project Manager with Woolpert.
Raymond Cordon, P.E. was involved in the early stages of the project design.
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Pipeline and Manhole Triage: Does Your Collection System Need Emergency Treatment?

By Chris Browning, Vice President, McKim & Creed

“The pipeline and manhole triage approach to infrastructure management can save utilities about 30% of the traditional diagnostic expenses.”

If your collection system infrastructure is ready to fail, then it may be time for pipeline and manhole triage.

As with medical triage, pipeline and manhole triage allows one to quickly diagnose and focus upon the issues that are potentially the most likely to cause system failure. This approach to system rehabilitation and repair focuses on the most critical areas, thereby increasing the system’s chances of performing as intended.

Traditionally, utilities have employed conventional closed-circuit television (CCTV) methods to inspect collection systems and prioritize the segments and areas that need corrective action, such as debris removal, grease and/or root abatement, repair/rehabilitation, or replacement.

Usually, however, 60 to 70% of the collection system operates as intended and requires no corrective action. Unfortunately, utilities often end up spending scarce resources evaluating large portions of the operational sewer systems when only a small portion of the infrastructure requires immediate or near-term attention.

The pipeline and manhole triage approach employs high-resolution, pole-mounted zoom cameras to 1) quickly assess and certify all accessible manholes, 2) collect relative system information, and 3) perform cursory pipeline inspections to identify high-priority areas. Once those areas are identified, CCTV is used to closely inspect, identify and evaluate defects.

Standard defect coding is used to code and rank the segments of pipe and manholes that require maintenance, repair/rehabilitation or replacement. Engineers then evaluate the data, perform additional criticality assessment (consequence of failure), and recommend cost effective corrective actions in priority order. The flow chart in Figure 1 depicts the triage inspection process (note that the manhole inspection and pole camera pipe evaluations are performed concurrently).

Depending on the age of the utility, the pipeline and manhole triage approach to infrastructure management can save utilities about 30% of the traditional diagnostic expenses, and the work can be completed in about half the time of conventional inspection programs. Therefore, triage quickly identifies possible sewer problems that could contribute to sanitary sewer overflows (SSOs).

Project deliverables for pipeline and manhole triage include a current and comprehensive inventory and

Figure 1.

Pole camera shot showing root intrusion inside a pipeline.
Pole camera shot showing collapsed pipe.

Pole camera shot showing displaced joint in pipe.

Pole-mounted zoom cameras can quickly assess and certify all accessible manholes, collect relative system information, and perform cursory pipeline inspections.

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ABOUT THE AUTHOR
Chris Browning is a vice president with McKim & Creed (www.mckimcreed.com) and heads the company’s Water/Wastewater Technology Practice. Chris is the current national treasurer of the Water Environment Federaton (WEF) and the former assistant director of public works for Fulton County, Georgia. He can be reached at cbrowning@mckimcreed.com.

* All photos courtesy of CES.
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In collaboration with the Water Environment Research Foundation (WERF), the Water Research Foundation (WaterRF) is coordinating the distribution of grants under the Aging Water Infrastructure (AWI) program. The AWI program is a research program funded by the Environmental Protection Agency (EPA), which includes a cooperative agreement with WERF/WaterRF, as well as other work conducted by other non-profit research groups and the EPA. In this third year of the four-year program with WaterRF, $500,000 will be allocated to three to four projects, selected from among a dozen proposals submitted in 2012. WaterRF is finalizing contract details for two projects, with another project or two to be identified by the end of the year. At that point AWI will have funded a total of nine projects with WaterRF, all aimed at improving and/or evaluating promising technologies and techniques to reduce the cost, and improve the effectiveness of operation, maintenance, management and replacement, of deteriorating water infrastructure.

“It is a comprehensive program focused primarily on trying to understand the deterioration of infrastructure so you can better plan its renewal,” explains Frank Blaha, Senior Research Manager at WaterRF. Launched in 2009, AWI invites qualified organizations to submit proposals in any of four technical areas related to aging water infrastructure. These technical areas include condition assessment, renewal, and innovative engineering related to utility assets. The fourth area eligible for project funding encompasses innovative treatment programs for emerging contaminants. “Very little has been done in that area so far, but some new projects are expected to begin this year,” notes Blaha. So far, two thirds of the funding has been allocated to projects related to wastewater or stormwater, involving infrastructure such as combined sewer overflows, deteriorating force mains, failing pumps in wastewater systems, etc. About a third of the funding has been devoted to pressurized potable water systems.

One of the three projects that are being funded in 2012 is an AC pipe renewal project by the Battelle Memorial Institute. Another is a joint project between HDR and the Los Angeles Department of Water and Power, evaluating a combined and inte-
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Aging

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grated condition assessment and renewal program for cast iron pipe of 12” or less.

Usually, there is a two to three-year gap between identification of problem pipes and their replacement. The goal of the project is to evaluate various assessment tools to determine which one would be most conducive to reducing or eliminating this delay. “Because of accounting procedures adopted by most utilities, a lot of condition assessment work ends up being placed in the operations and maintenance (O & M) folder,” explains Blaha. “There is not much money for O & M. Replacing the pipe, on the other hand, comes out of capital costs. How much more efficient is it to eliminate the delay and create a comprehensive program so that you are prepared to replace the pipe as you identify the bad asset?”

Part of the project involves determining the true cost of repeated pipe failure to determine whether there is empirical evidence to support the advantages of immediate replacement. “When it comes to aging water infrastructure, one of the biggest problems in North America is making a business case to do anything,” says Blaha, adding that decisions need to be evidence-based. “There is skepticism that any of our governments, including, municipal governments can be efficient rather than wasteful.”

He believes that water and wastewater research has an important role to play in helping utilities make a case for investing in aging water infrastructure. To further that goal, WaterRF plans to do an increasing amount of outreach and communication of project results. WaterRF recently launched several knowledge portals on its website. As the 2009 projects start to wrap up, valuable information and data will be made available through the portals.

“This was identified by our subscribers and water utilities as one of the key areas in which they need help,” notes Blaha. “We are trying to help utilities make a good, scientific, reproducible case for how good decisions can be made. That involves a variety of technical areas, but ultimately that is where we are heading. We anticipate that we will continue to focus on this theme for at least three or four more years.”

Although funding for year four of AWI is uncertain – in year two, the program received two thirds of projected funding, followed by three quarters in year three – WaterRF is committed to seeing the program run its course, even if that means finding alternate sources of funding. The plan is that, eventually, AWI will be folded into the EPA’s Safe Sustainability Water Resources Program. As the larger program ramps up, there will be a ramping down of AWI-specific funding. “In two to three years, we will know how it all plays out,” says Blaha. In the meantime, he invites non-profit organizations and universities conducting research in the water and wastewater industry to consider what types of proposals they would submit in response to any year four funding that might come through in the AWI program. They should also occasionally visit the WaterRF website to look for any new requests for proposals (RFPs), especially in March 2013, when as many as twenty RFPs will be released, some focused on topics of interest to the AWI program.

(*Results of the AWI program can be found at the EPA website at http://www.epa.gov/awi. *)

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As we humans age and mature from infancy through our senior years, we pass through several stages of development. Many times along this continuum of life, we may pause to reflect on our experiences and the events that have influenced the development of the person we have become at that stage in life. We may also take time to ponder our vision for our future and how we may achieve that vision. This concept of human development is very applicable to the creation and growth of the NC Safewater Endowment Program.

In this article, I will provide information on the establishment of the Endowment Program, the events and individuals that have influenced the growth of the Endowment Program from infancy to pre-adolescence (three-years-old) and a vision of what a more matured and well-funded Endowment Program could accomplish.

**Establishment of NC Safewater Endowment Program**

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.

The members of the Endowment Task Force were Doug Bean, Glendon Fetterolf, Don Francisco, George Raftelis, Joe Stowe, and Darin Thomas. Darin was elected chair of the task force. Steve Shoaf appointed Les Hall as the Board liaison with the task force.

Over a period of about eighteen months, the task force met with several individuals who had expertise working with funding programs that provided financial assistance to individuals similar to our target recipients. After reviewing the information gleaned from these meetings, the task force decided to hire a consultant to determine the level of support our members might have for an endowment program. He conducted an electronic survey of all of our members and a person-to-person survey of more than 30 leaders of corporations and utilities. Based on his findings, he concluded that the members would support an endowment program.

After reviewing the consultant’s report and evaluating other information its member had collected, the Endowment Task Force agreed 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 recommendations of the Endowment Task Force in September, 2009. These recommendations included:

1. allocation of $25,000.00 from the NC AWWA-WEA reserve fund for the initial funding of the NC Safewater Fund;
2. approval of the Public Education Committee donation of $25,000.00 to establish The Carol Bond Fund;
3. adoption of Policies and Procedures of Endowment;
4. approval of an Endowment Committee and appointment of the members of the Endowment Task Force as its initial members; and
5. approval of establishing an agency fund with Triangle Community Foundation.

In the opening paragraph of the Policies and Procedures Endowment document, the Board of Trustees of NC AWWA-
WEA states that it “establishes the NC Safewater Endowment as a permanent Board-designated agency fund for the purpose of promoting safe water, increasing knowledge and understanding of safe water, preserving and enhancing the water environment. The primary means for accomplishing this purpose is to provide scholarship funds to individuals who seek assistance in order to complete 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. In addition, the NC Safewater Endowment Program will award funds to assist educators in providing enhanced water environment education to registered students and/or the public.”

The Board of Trustees has continued to support the Endowment Program from its inception to its present stage of development.

Growth of the Endowment Program
From its inception, the NC Safewater Endowment Program’s growth has been fueled by pledges and donations from individuals and firms. Highfill Infrastructure Engineering, P.C. made the first major pledge of $10,000 in March 2010. In July 2010, George and Eva Raftelis founded the first ‘named fund:’ Raftelis Foundation Elementary Education Scholarship through a donation from their Raftelis Foundation. In December 2010, Les and Elaine Hall made a pledge of $25,000 to fund The Les and Elaine Hall Water Environment Stewardship Fund as the second ‘named fund’ created from donations other than NC AWWA-WEAs two initial ‘named funds.’

In the spring of 2011, the Endowment Committee decided to launch its first organized fund raiser: NC Safewater Fund Raising Initiative of 2011. Each of the more than 30 members of NC AWWA-WEA who volunteered to participate agreed to contact 10 to 20 potential donors that he/she had selected. In addition to several smaller donations, six of the individuals/firms contacted during the fund raising initiative agreed to pledge $25,000 each in order to fund the six new ‘named funds.’ In June 2012, an anonymous donor made a pledge of $25,000 to fund the eleventh ‘named fund.’ All 11 of these ‘named funds’ along with the name of the donor are listed below. We are very thankful for the individuals and firms that have given at this level. More information on how an individual can apply to be considered for a scholarship or grant awarded by these ‘named funds’ can be found on the web at http://www.ncsafewater.org/committees/executive-council/endowment_committee.

<table>
<thead>
<tr>
<th>Name of Donor</th>
<th>Name of Named Fund</th>
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<tbody>
<tr>
<td>Raftelis Financial Consultants</td>
<td>Raftelis Financial Consultants Environmental Finance and Management Scholarship</td>
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<tr>
<td>GHD Consulting, Inc.</td>
<td>The GHD Clean Water Fund</td>
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<tr>
<td>Frank and Susan Stephenson</td>
<td>The Frank and Susan Stephenson Scholarship Fund</td>
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<td>Crowder Construction Company</td>
<td>The Crowder Construction Company Scholarship</td>
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<tr>
<td>Lynn and Lars Balck</td>
<td>The Lynn and Lars Balck Water Environment Stewardship Fund</td>
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<td>NC AWWA-WEA Board of Trustees</td>
<td>NC Safewater Fund</td>
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<td>NC AWWA- WEA Public Education Committee</td>
<td>The Carol Bond Fund</td>
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<td>Raftelis Foundation</td>
<td>Raftelis Foundation Elementary Education Scholarship</td>
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<tr>
<td>Les and Elaine Hall</td>
<td>The Les and Elaine Hall Water Environment Stewardship Fund</td>
</tr>
<tr>
<td>Anonymous</td>
<td>Environmental Manufacturer’s Representative Scholarship Fund</td>
</tr>
</tbody>
</table>

In addition to the 11 ‘named fund’ donors, we have received corporate donations greater than $5,000. These corporate donors are listed below:

Swift Stream Corporate Donors: ($5,000 to $9,999)
- Hazen and Sawyer, PC
- HDR Engineering, Inc.

Roaring Rivers Corporate Donors: ($10,000 to $14,999)
- Highfill Infrastructure Engineering, PC
- W K Dickson & Company, Inc.

Great Lakes Corporate Donor: ($15,000 to $24,999)
No donors at this level
Mighty Oceans Corporate Donors: ($25,000 and greater)
See List of “Named Fund” Donors

We also thank and recognize other corporate and individual donors listed below:

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Matthew Shoesmith
Mike Osborne
Mr. and Mrs. Robert Osborn
Nicole Banks
Pam Moss
Perry James, III
Richard Thoesen
Richard Tsang
Robert and Christine Berndt
Robert Griffin
Robert Massengill
Roger Spach
Russell Brice
Steve Drew
Steve Shoaf
T. J. Lynch
Terry Houk
Thomas Lipinski
Tim Broome
Trevor Clements
Vicki Westbrook
Wayne Miles

We encourage ALL MEMBERS to join the members listed above and make a donation to NC Safewater Endowment Program. You can make a donation by going to http://www.ncsafewater.org/committees/executive-council/endowment_committee and downloading a pledge form, completing it and mailing the form and your donation to the address shown on the pledge form. Your gift will keep on giving and thereby will help future water professionals obtain the education they will need to work in the water industry in the future and will enable environmental educators to have the resources to better teach students about water and the importance of having a dependable supply of safe water.

Vision for the Future of NC Safewater Endowment Program
One of the findings that the consultant presented in his report was that after he had reviewed all the data collected in his surveys, he had concluded that a philanthropic culture did not exist in NC AWWA-WEA. In organizations that do have a philanthropic culture, almost all of their members feel a commitment to support causes sponsored by their organization with their time and resources every year. If a philanthropic culture existed at NC AWWA-WEA we would expect that almost all our 3300 members would contribute time and/or resources to support and help grow the assets of the NC Safewater Endowment Program. For example, if each of our 3300 members contributed $2 per month ($24 per year) to the Endowment Program, we could grow the assets by $79,000 each year. The earnings from this increase in assets would generate more than $3,000 to fund scholarships and grants each year, in perpetuity. This means that, each year, NC Safewater Endowment could increase the number of students and teachers who are awarded scholarships and grants. The Endowment Committee has a vision that, one day, a philanthropic culture will exist in NC AWWA-WEA and that all of our members will contribute to the Endowment Program.

We also think that the NC Safewater Endowment Program will continue to improve NC AWWA-WEA’s legacy of providing education to water professionals. If we sustained a growth of assets of $100,000 per year, the Endowment Program would have assets of over $1,000,000 within the next seven years. (As of June 30, 2012 NC Safewater Endowment Program has received pledges of over $344,000.) With assets at this level, the NC Safewater Endowment Program would be a significant provider of scholarships and grants to students and teachers. We envision that NC AWWA-WEA would receive recognition of its support of education and training of water professionals from outside entities such as universities, school systems, governmental agencies and the public.
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NCSU Project Representing NC at WEFTEC

During the spring 2012 semester, the Students & Young Professionals committee and the NCSU Student Chapter partnered with the Water Resources and Environmental Engineering Senior Design Class in the Department of Civil, Construction, and Environmental Engineering. The result of the partnership was the selection of one team to represent NCAWWA-WEA and present their project at the Student Design Competition at WEFTEC in New Orleans this September. The team from NCSU will compete against teams from across the country in the Environmental Design division with Prizes awarded for first, second, third and fourth place.

The title of the team's project is “ Retrofitting Urban Development with Best Management Practices in Durham, NC.” The project presents a design for the retrofit of the 25-year old Durham Plaza Shopping Center with stormwater best management practices. No stormwater controls currently exist on the 30-acre site, making it ideal for redevelopment. The proposed retrofit consists of vegetated swales, an enhanced riparian buffer, cisterns, and a set of level spreaders. To accommodate the retrofit, the project calls for the parking lot to be regraded and repaved. An educational center is also included to garner public support for future stormwater retrofit projects. The project team members - who graduated from NCSU in May 2012 and are now in positions across the country are: Ruth Small (Assistant Engineer with Hazen and Sawyer), Andrew Spicer (Eaton Corporation), Matthew Woelfle (pursuing a PhD in Atmospheric Science at the University of Washington), Katie Dorety (interning at UNC-Chapel Hill), and Jared Hostetler (Beaufort-Jasper Water and Sewer Authority, Okatie, SC). The NCSU Student Chapter and committee members are now working to have the Design Competition incorporated into the Senior Design curriculum for the fall semester. NC AWWA-WEA plays an important role in the senior design class by providing mentors to the student groups throughout the semester. If you are interested in mentoring a group of students please contact Melinda King at melinda.king@greensboro-nc.gov or Leigh-Ann Dudley at ldudley@dewberry.com.

2012 Carol Bond College Scholarship Recipient

Alma Beciragic, a student at Queens University in Charlotte, NC, is this year’s recipient of the Carol Bond University scholarship. Ms. Beciragic is majoring in Environmental Science with a minor in the Physical Sciences, and a minor in Advanced Statistical Chemistry. In addition to her exceptional academic record, in the summer of 2011 she held a position as an intern in the Charlotte Mecklenburg Utilities Department through the Summer Energy Internship Program that was funded by the NC State Energy Office. During her internship, she conducted a study titled “CMUD Fuel Efficiency Analysis for Customer Service and Field Operations Divisions” that is currently being utilized by the CMUD as a basis for more effective deployment of service technicians. After completing her undergraduate studies, Ms. Beciragic would like to pursue a doctorate in Infrastructure and Environmental Systems.

2012 Drinking Water Week Poster Contest

Each year, the NC AWWA-WEA’s Public Education Committee sponsors a poster contest.
contest in conjunction with the celebration of Drinking Water Week in May. This year’s theme was “Wasting Water is Weird.” Students in grades K-8 are eligible to participate and are separated into three divisions: K-2, 3-5, and 6-8. All utilities in the state are encouraged to promote the contest among local schools (public and private) and home schoolers. Participating members select first place winners from their city/utility, which are submitted for the statewide competition. PEC members then select first, second and third place winners in each division. This year’s winners are as follows:

**State Level K-2 division winners:**

- **First Place**
  Jerich T. Jodon  
  (Shadybrook Elementary, Greensboro)

- **Second Place**
  Kushi Jakati  
  (Brooks Global Elementary, Greensboro)

- **Third Place**
  Perla Perez Boyzo  
  (E.K. Powe Elementary School, Durham)

**State Level 3-5 division winners:**

- **First Place**
  Maggie McGehee Wittman  
  (Durham Academy, Durham)

- **Second Place**
  Claire Ridley  
  (Easley Elementary School, Durham)

- **Third Place**
  Casey Carrow  
  (Durham Academy, Durham)

**State Level 6-8 division winners:**

- **First Place**
  Yaquili Tolentino  
  (W.G. Pearson Middle School, Durham)

- **Second Place**
  Amelia Bryant  
  (Voyager Academy, Durham)

- **Third Place**
  Narayeli Alvarez  
  (W.G. Pearson Middle School, Durham)
Spring into Operation
The NC AWWA-WEA Spring Conference Committee is soliciting presenters for the 12th Annual Spring Operations Conference: Spring Into Operation, which will take place April 14 - 16, 2013 at the Wilmington Convention Center in Wilmington, NC. As the new tagline “Spring into Operation” suggests, one of the goals of the conference is to enhance the conference experience for operation and maintenance professionals. Presentations are being sought that appeal to or directly feature operations and maintenance professionals; and presenters are encouraged to team with operators and other water and wastewater system owner personnel.

Technical Sessions will cover water, wastewater, industry-related special topics, such as collection & distribution, policy & management, industrial treatment, laboratory, and stormwater. Abstracts are due October 1, 2012. Selected presenters will receive further instructions on final presentation format and deadline at a later date. Full papers are not required for this conference. For instructions on submitting an abstract visit www.ncsafeewater.org.

AWWA, WEF Explore Collaboration
In 2011, the American Water Works Association (AWWA) and Water Environment Federation (WEF) boards approved a joint resolution that encourages collaboration among our members and greater coordination of programs and services. AWWA and WEF remain committed to the spirit of the 2011 resolution. Both organizations have signed an Agreement of Intent that establishes an Exploratory Committee to examine potential models for enhanced collaboration and partnership to better serve our members.

The Exploratory Committee is comprised of leaders from both organizations and will examine potential models for enhanced collaboration and partnership ranging from efficiencies in some combined business practices and member services to full integration of the two organizations.

Discussions about enhanced collaboration and cooperation between AWWA and WEF have occurred on and off for a number of years and are driven by a desire to deliver better service and value to our members as both organizations respond to significant changes in the water industry and among our members. AWWA and WEF will continue to work together to best serve our members and the broader water industry and will keep our members apprised as our exploration of enhanced partnership continues.

NCWTFOCB Policy Update
The North Carolina Water Treatment Facility Operators Certification Board passed a new policy on 6/6/2012 regarding operator requirements for supplemental treatment facilities and purchase systems that provide treatment. Below is the new policy.

Policy Regarding: Operator Requirements for Supplemental Treatment Facilities and Purchase Systems that Provide Treatment

Definition of “Supplemental Treatment Facility” (See 15A NCAC 18C .1303(a) (3)(A): A supplemental treatment facility, including booster chlorination, is a facility designed to treat water that has previously been treated to meet standards of the “North Carolina Drinking Water Act.”

Type of Operator Required: Either Well or Surface Grade is acceptable (distribution system grades are not acceptable).

Grade of Operator Required: Grade required shall be equivalent to or shall exceed the approved system treatment classification.

Experience Credit for Operation: Experience at a supplemental treatment facility shall be equal to experience at a well water treatment facility.

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Death of Kevin Eberle
On Tuesday, January 3, 2012, the engineering community lost a coworker, a friend and a true professional. Kevin C. Eberle, PE, 56, a senior project man-
Kevin Eberle, Andrea Nifong, Les Hall and Keith Lane accept a 2009 Engineering Excellence Grand Award from the American Council of Engineering Companies of North Carolina.

Manager and project director with McKim & Creed, passed away after a long and courageous battle with cancer.

Kevin’s enthusiasm for and dedication to his profession were truly exceptional. He has been described by his coworkers as a man of boundless optimism and faith, a creative problem-solver, and a professional with an unwavering positive attitude and demeanor and a genuine interest in the welfare of others.

Kevin graduated from Colorado State University and the University of Vermont, where he earned undergraduate and graduate degrees, respectively, in civil engineering. He was a member of AWWA, and WEF, and was a past member of the WEA Wastewater Reuse Committee. He joined McKim & Creed in 2000.

A resident of Cary, Kevin was married to Karen and was the proud father of two children, Meghan and Brennan. Kevin was nothing short of inspirational during his battle with cancer. He leaves a tremendous personal and professional void at McKim & Creed and throughout the engineering community.

Launch of Robinson Water, PLLC

Joe Robinson, PE, has launched the engineering firm Robinson Water, PLLC. Joe has over 22 years of experience in the design, permitting and construction phase services for water and water-related projects, with the 12 most recent years in the Carolinas. His is active in the Water for People Committee of NC AWWA/ WEA, and has helped in the planning and administration of the annual WFP 5k Fun Run.

Prior to forming Robinson Water, Joe worked for several national engineering firms and one regional engineering firm. He earned a master’s degree in environmental engineering and a bachelor’s degree in civil engineering from Virginia Tech. Joe is a licensed professional engineer in North Carolina, South Carolina, Virginia, Georgia and Florida.

Robinson Water is based in Matthews, NC and offers water quality consulting, pump station design and rehabilitation, and construction phase services. Robinson Water holds a firm license in North Carolina and a Certificate of Authorization in South Carolina.

Morehead Joins Davis-Martin-Powell

(High Point, NC - May 1, 2012) Davis-Martin-Powell (DMP) is pleased to announce that Jason Morehead, PLS will be joining DMP as our new Director of Surveying. Jason has 17 years experience in Land Surveying and CAD Drafting, with over 7 years in a Project Management role.

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## Schedule of Events

The following schedule is current as of September 18, 2012. 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.ncsafeewater.org.

### October

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<td>10</td>
<td>NC AWWA-WEA Seminar: WARN and Other Emerging Issues in Risk Management</td>
<td>Greensboro, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>11</td>
<td>Professional Wastewater Operators Meeting – Western Region</td>
<td>Asheville, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>15-19</td>
<td>Coastal Collection &amp; Distribution School</td>
<td>Morehead City, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>25</td>
<td>NCWTFOCB Certification Exam</td>
<td>Kinston, Morganton, and Raleigh, NC</td>
<td>NCWTFOCB (919) 707-9040</td>
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<tr>
<td>31</td>
<td>NCWOA Seminar: Change Management – Maintaining The Front Line’s Freedom To Operate</td>
<td>Burlington, NC</td>
<td>NCWOA (252) 764-2094</td>
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### November

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<td>6</td>
<td>NC AWWA-WEA Webinar: Finance &amp; Management Webinar</td>
<td>Online</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>8</td>
<td>Professional Wastewater Operators Meeting – Eastern Region</td>
<td>Red Springs, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>8</td>
<td>NCWOA Seminar: Completing the Cycle: Water Distribution &amp; WW Collections</td>
<td>Dunn, NC</td>
<td>NCWOA (252) 764-2094</td>
</tr>
<tr>
<td>11</td>
<td>NC AWWA-WEA Board of Trustees Meeting</td>
<td>Raleigh, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>11-14</td>
<td>NC AWWA-WEA 92nd Annual Conference</td>
<td>Raleigh, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>14</td>
<td>NC AWWA-WEA Board of Trustees Meeting</td>
<td>Raleigh, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>26-27</td>
<td>AWWA Customer Service Representative Training – Course 1</td>
<td>Brunswick County, NC</td>
<td>NC AWWA-WEA (252) 764-2094</td>
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### December

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<tr>
<td>4</td>
<td>NC AWWA-WEA Seminar: Construction</td>
<td>Huntersville, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>4</td>
<td>NCWOA Seminar: Water Systems Operations: Keeping it Simple</td>
<td>Almond, NC</td>
<td>NCWOA (252) 764-2094</td>
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<tr>
<td>5</td>
<td>NC AWWA-WEA Seminar: Pipeline</td>
<td>Huntersville, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>10-11</td>
<td>AWWA Customer Service Representative Training – Course 3</td>
<td>Brunswick County, NC</td>
<td>NC AWWA-WEA (252) 764-2094</td>
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<tr>
<td>13</td>
<td>Professional Wastewater Operators Meeting – Central Region</td>
<td>Cary, NC</td>
<td>NC AWWA-WEA (919) 784-9030</td>
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<tr>
<td>13</td>
<td>NCWOA Seminar: Basics 2012 – Training Tomorrow’s Drinking Water Leaders Today</td>
<td>Statesville, NC</td>
<td>NCWOA (252) 764-2094</td>
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So enjoy this magazine...and KEEP THINKING GREEN.
NC Currents Future Themes & Submission Deadlines

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 5:00pm 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 issues 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.

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<th>Theme: Prosperity – Past, Present &amp; Future (Submission Deadline January 7, 2013)</th>
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<td>SUMMER 2013</td>
<td>Theme: Outreach/Water For People* (Submission Deadline April 8, 2013)</td>
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<td>Theme: Emerging/Potential Contaminants* (Submission Deadline July 8, 2013)</td>
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<td>WINTER 2014</td>
<td>Theme: Operations Management* (Submission Deadline October 1, 2013)</td>
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*Descriptions for these themes will be posted at www.ncsafewater.org once they are available.
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