SUMMER 2007
OHIO SECTION
NEWSLETTER
AMERICAN WATER WORKS ASSOCIATION

Beyond an "Average Day"– How Much Water Should Be Stored?

by Dan Barr, PE, Burgess & Niple, Inc.

Three Components of Storage

Every distribution manager's goal is to completely understand their distribution system's capabilities. They want to know exactly when and where an improvement project is required and how large the new main, pump, or storage tank should be.

This article provides a storage and pumping capacity analysis that is powerful, straightforward, and will provide an understanding of the capabilities of a distribution system during critical demand conditions. This analysis will help any utility understand its current and future storage and pumping requirements. Ultimately, they will know what their system is capable of and how to improve the weaker parts effectively.

The process that follows will help analyze a distribution system through the evaluation of three components: emergency outages, fire protection, and operational needs (balancing and turnover). These components will be precisely defined, and what information and calculations will be needed to determine each. Once the information is collected, it can be entered into a spreadsheet to determine system requirements.

The question might be asked, "Why should we care about this? Everything has worked fine at my utility for decades. There's no reason for more storage. Our utility already has an average day's worth of storage." This sounds like a valid point. But has the system experienced a large fire or outage over the last few decades? How about a significant main break? If so, how did the system handle those situations? Did it run out of water too fast or experience low pressures? How does the system perform when it is being stressed by maximum hour demands? Have any or all of these events happened in every pressure district? Is the system experiencing water quality issues like low chlorine residuals or high disinfection byproducts?

Every system needs to be analyzed so operators understand its strengths and weaknesses and can plan for them. Insufficient system storage can lead to inferior fire protection, premature customer outages, and low pressures during maximum hour events. Conversely, too much storage can lead to water quality problems such as red water or low chlorine residuals.

continued on page 6

2007 Ohio Section Governing Board/ District Officers

Chair
Melinda Raimann, Cleveland Division of Water
216-664-2444 x 5638
melinda_raimann@clevelandwater.com

Vice Chair
Cliff Shrive, RD Zande & Associates, Inc.
513-769-5009 • cliffshrive@zande.com

3rd Year Trustee
Don Freisthler, City Of Sidney
937-498-8180 • dfreisthler@sidneyoh.com

2nd Year Trustee
Danella Pettenski, City of Columbus
614-645-7677 • ddpettenski@columbus.gov

NE Trustee
Bob Davis, Warren Water Plant
330-841-2710 • bdavis@warren.org

At Large Trustee
Tyler Converse, Chief Chemist, City of Canton, Water Dept.
330-489-3308 • Tyler@ci.canton.oh.us

Directors
Marvin Gnagy, URS Corporation
419-246-0839 • marvin_gnagy@urscorp.com

Chris Jarrett, American Cast Iron Pipe Co.
412-851-1230 • cjarrett@acipco.com

Treasurer
Bob Gardner, City of Westerville
614-901-6776 • rgardner@westerville.org

Secretary
Karen Hawkins, City of Fairborn Water Department
937-754-3097
karen.hawkins@ci.fairborn.oh.us

Assistant Secretary
Keshia Johnson, Cleveland Division of Water
216-664-2444
keshia_johnson@clevelandwater.com

Professional Services
RaShawn Truss, OTCO
614-265-3180 • oawwa@ohiowater.org

Curtis L. Truss Jr., OTCO
614-268-6826 • curtis@ohiowater.org

Northeast

District Chair
Ted Burton
City of Kent WTP
330-676-6333
TBurton433@sbcglobal.net

1st Vice Chair
Jeffrey J. Bronowski, PE
Akron Public Utilities Bureau
Water Supply Division
330-678-0077 x 439
bronoje@ci.akron.oh.us

2nd Vice Chair
Robin Liss P.E.
MWH
216-621-2407
Robin.A.Liss@mwhglobal.com

Past Chair
Kevin Givins
City of Wooster, WPCP
330-263-5294
kgivins@woosteroh.com

Secretary/Treasurer
Todd Fetty
Orrville Municipal Utilities
330-684-5135
tfetty@orrutilities.com

Asst. Secretary/Treasurer
Sandra Vozar
440-234-5652
svozar@bereaohio.com

MAC Representative
Matt Young
CH2M Hill Engineers
216-623-0402 ext. 15
matthew.young@ch2m.com

Northwest District

Chair
Karen Kovolo
Village of Ottawa
419-523-5020
Kkovolo@ottawaohio.us

1st Vice Chair
Kurt Smith
ARCADIS FPS
419-473-1121
kasmith@arcadis-us.com

2nd Vice Chair
Joe Flahiff
City of Fremont Water Treatment Plant
419-332-3581
jmflahiff@fremontohio.org

Past Chair
Ann Scott
Industrial Fluid Management, Inc.
419-294-8673 Office
alscott333@yahoo.com

Secretary/Treasurer
Richard Kroeger
Ohio EPA, Northwest District Office
419-373-4101
richard.kroeger@epa.state.oh.us

Asst. Secretary/Treasurer
Somnath Pandya
City of Lima
419-221-5170
Somnath.pandya@cityhall.lima.oh.us

MAC Representative
Thomas J Bierley
Technical Sales Representative
US Filter
419-427-1067
bierleyt@usfilter.com

Southeast District

Chair
Rick Shamblen
Malcolm Pirnie
614-888-4953
rshamblen@pirnie.com

Vice Chair
Sarah Wallace
Ohio EPA SE District- DDAGW
740-380-5207
Sarah.wallace@epa.state.oh.us

1st Vice Chair
Rod Dunn
Water Quality Assurance Laboratory
614-645-7691
rjdunn@columbus.gov

Past Chair
Susan Hampton
Ohio EPA, Division of Drinking And Ground Waters
614-728-5033
susan.hampton@epa.state.oh.us

Secretary/Treasurer
Brian Macy
URS
614-464-4500
Brian_Macy@urscorp.com

Assistant Secretary/Treasurer
Ralph Mohr
440-373-8615
remohr@suddenlink.net

MAC Representative
Gary Grigsby
SLC Meter Service, Inc.
866-369-4844
gwgrigsby@earthlink.net

Southwest District

Chair
Richard Pohlman
Greater Cincinnati Water Works
513-624-5623
Richard.Pohlman@gcww.cincinnati-oh.gov

Vice Chair
Leslie Ostrozny
Montgomery County Sanitary Engineering Department
937-781-2628
ostroznyl@mcohio.org

1st Vice Chair
David Weihrauch
City of Oxford
513-523-1753
dweihrauch@cityofoxford.org

2nd Vice Chair
Keshia Kinney
2nd Vice Chair
City of Dayton
937-333-6054
keshia.kinney@cityofdayton.org

Past Chair
Lorrie Brown
City of Dayton Water Department
937-333-6135
lorrie.brown@cityofdayton.org

Secretary/Treasurer
Beverly Engram
Greater Cincinnati Water Works
513-591-6868
Beverly.engram@gcww.cincinnati-oh.gov

Asst. Secretary/Treasurer
Margie Thomas
City of Fairborn
937-754-3097
Margie.thomas@ci.fairborn.oh.us

MAC Representative
Ted Simmons
Ferguson Waterworks – Midwest Pipe
513-942-2525
ted.simmons@ferguson.com

Straight From The Chair

American Water Works Association
2007 Ohio Section Conference
Hilton Cincinnati Netherland Plaza – Cincinnati, Ohio
September 18 – 21, 2007

Melinda L. Raimann,
Ohio Section Chair

On behalf of the Ohio Section AWWA Governing Board and our local arrangements committee, I am pleased to officially invite you to join the Governing Board during the 69th Annual Conference, to be held at the Hilton Cincinnati Netherland Plaza Hotel in downtown Cincinnati from September 18 to 21, 2007.

Wasserfest Zinzinnati – A Celebration of Water, Cincinnati Style will highlight the heritage of Cincinnati, and allow you to experience water "From Nature to the Tap". This year's local arrangements committee, with volunteers from all over Southwest Ohio, has put together a conference you'll remember for years to come. The Technical Program Committee has also assembled technical sessions that will appeal to all aspects of water. "From Nature to the Tap" covers water resources management through treatment and supply, as well as administrative tasks such as customer service, information technology, and safety. The Conference wraps-up Friday with discussions with OEPA personnel, and about regulatory aspects which impact our water community.

Technical Sessions are available each day of the conference, beginning with "Early Bird" sessions on Tuesday. The annual golf tournament will once again be held at the Kenton County GC, and we'll be gathering at Hofbräuhaus Newport that evening to start the Celebration off right.

Wasserfest
ZINZINNATI
A Celebration of Water
Cincinnati Style
From Nature to the Tap

Take a walk on the wildlife with Thayne Maynard, this year's Keynote Speaker! And with an anticipated 100 exhibitors on Wednesday, don't miss out on gaining additional contact hours by participating in the Exhibit Tours. A Communications Seminar, sponsored by the Diversity Committee, will also provide contact hours for those in attendance. And don't forget to support your District or local Tapping and Top Ops Teams during the Exhibits. The evening will draw to a close with a mixer sponsored by our YP, Membership and Diversity Committees.

Finally, be sure to experience 100-yrs of water treatment for Cincinnati, during Friday's tour of the historic Richard Miller Treatment Plant River Station. 1907 seemed only a moment ago…

Your can visit our website http://www.ohiowater.org/oawwwa for conference updates and additional forms. Auf Wiedersehen, and see you in Zinzinnati!

Brian Bisson Nominated Association Director

Brian Bisson is Vice President of Engineering for Aqua Ohio, Inc. As VP and Chief Engineer, he is responsible for planning, design, construction administration, department staffing, and managing the capital budget for Aqua Ohio and the Shenango Division of Aqua PA. Brian's department is Ohio EPA self-certified for distribution designs, one of only a few in the state. His group designs more than 20 miles of water main per year. In the past 16 years his department has designed more than 40 booster stations, six water storage tanks, and numerous water treatment projects. Capital budgets are averaging more than $20 million per year. Aqua serves more than 350,000 people in Ohio and western PA with systems ranging from one serving 250 people to one serving nearly 100,000 people.

Brian has BS and MS Degrees, both in Civil Engineering from the University of Maine at Orono. He is a registered Professional Engineer in Ohio, PA, and Maine. He has also attended several courses, including the National Association of Regulatory Commissioners Rate Seminar, Total Quality Management Seminars, and Accounting & Finance for the Non-Financial Manager at the Ohio State University. He has taught a civil engineering course at Youngstown State University, and he has presented many papers at AWWA District, State, and National meetings.

Brian has been a member of AWWA for more than 25 years. He is a past Chair of the Ohio Section Board. He is proud of the success of the Distribution Committee and the Strategic Planning Committee, both of which he began while serving as Chair. The Distribution Committee has provided many popular training seminars, and the Strategic Planning Committee has helped to clarify and guide planning and goal setting for the Section. Brian has served on several AWWA Ohio Section and Association level committees. He is currently on the Technology Committee for which he was one of the original members, and he is Chair of the Water For People Committee. He is also a member of the American Society of Civil Engineers and the Ohio Water Environment Association.

Brian received the WFP Kenneth Miller Founders Award at the AWWA ACE in Toronto in June. In one of WFP's recent fundraising efforts, Brian along with other Aqua personnel raised more than $1,400 at its second annual day of fishing at Pine Lake, which is just one of the lakes owned by Aqua. In addition, Brian headed up a WFP Drawing for Superbowl Tickets about two years ago that raised $25,000 for WFP.

Brian and Ricki have been married for 32 years and have two children, Ben and Alex. Still living at home are two rambunctious schnoodles (dogs), Abby and Johnny. Brian is also active in his church, and loves to play golf.

Congratulations

Karen Hawkins Nominated SW District Trustee

Karen Hawkins has been employed by the City of Fairborn for over 20 years with 17 of those years being in the water field. She currently serves as the Utilities Superintendent of the City's Division of Water and Sewer. She holds State of Ohio Class III Water and Class II Wastewater Collection licenses as well as being certified by the Ohio Department of Commerce as a Certified Backflow Tester.

Karen's involvement with the Ohio Section began at the microphone in 1992 as emcee for the annual water main tapping contest. While still a member of the tapping committee, her participation has expanded to other areas as well. She is currently the Ohio Section's Secretary after having been the Asst. Secretary/Treasurer. She spent five years as a Southwest District officer and continued to serve her district following that time when she undertook coordination of their annual Expo Contact Hour Tours. For six years she served as OAWWA's SW representative to the OTCO board of Trustees including serving as Board President and remains involved with the organization as a backflow instructor. She even continues to man the microphone on occasion as a speaker at district and state functions.

Karen has been supported in both her career and her AWWA participation by her family. Her husband, Roy, has become a familiar face at the registration desk at the annual conference and her children, Amanda and Stephen, have even been drafted on occasion including working study session registration when mom was a district officer. Karen's leisure time is generally spent with family including traveling; rooting on the Dayton Dragons, the Reds and Bengals, and gardening.

Lorrie Brown Nominated At Large Trustee

Lorrie Brown has 17 years of experience in the water and wastewater industry. She started with the City of Dayton as a Bacteriologist/Chemist and is currently the Water Supply and Treatment (WS&T) Research and Control Specialist. Lorrie researches and investigates treatment technology and regulatory changes. She works to allocate City resources for reliable, cost effective water treatment and ensures treatment optimization and compliance. Lorrie received City recognition for exemplifying "Safety Leadership" and helped the WS&T Division to achieve the 2005 City of Dayton "Safety Leadership" recognition. Lorrie participates on many city committees and promotes the city of Dayton WS&T Division through a biannual newsletter.

Lorrie has a BS in Biological Sciences from Wright State University, is a member of AWWA, Past Chair of the Ohio Section Southwest District, SW EXPO tour coordinator for 2007 and a Past Chair of the OAWWA Safety Committee. Lorrie holds a Wastewater Laboratory Analyst III certification, a Class I Wastewater Operator license and a Class III Water Operator license.

continued from page 1 - average day

The Analysis

The analysis is straightforward enough that each utility can perform the work themselves. The most difficult step in the process is gathering the required data which, depending on availability, can range from very easy to very difficult.

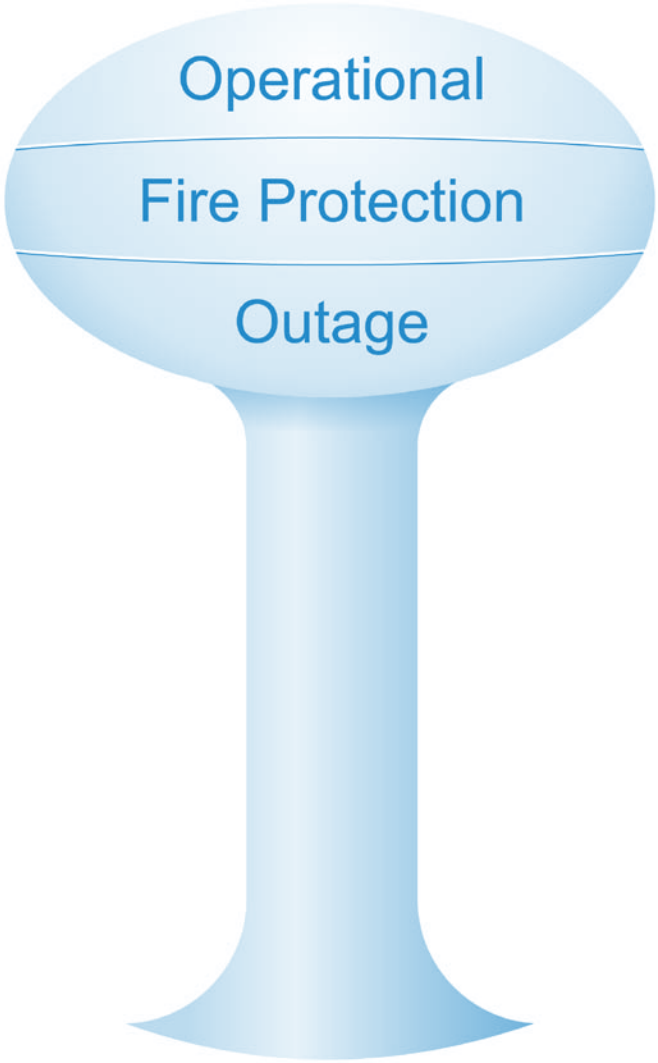
The data that is required to perform this analysis includes water demands, existing system storage volumes, and existing pumping capacity. For the analysis to be effective, each of these should be broken down by district. Water demands must include maximum hour, maximum day, and average day demands.

The existing storage volumes and pumping capacities should be available in as-built information, O&M manuals, or nameplate information. Do not include any system storage that is situated lower than 46.2 feet above the highest portion of the system (or below 20 psi) such as the lower portions of standpipes. Flow meters and/or distribution computer models also can be used to help identify pumping capacities.

Demand information is usually harder to collect. The best situation would be to have several years of flow data at each pumping facility. Procedures for determining demands where this is not available are beyond the scope of this article, but there are many ways to estimate this information. Pump run times, tank level records, and reviewing customer meter records are all effective ways to determine demands. There are many documented methods of estimating demands - especially methods used to help create water distribution computer models. Use creativity and any available information and this process should not be too difficult. If the analysis starts to expose weaknesses that are large capital investments, some minor investments in better data collection (like additional flow meters) might provide a clearer analysis and more effective system improvements.

Emergency Outages

The simplest component to calculate is the minimum required emergency outage volume. This component deals with situations when the source(s) for each district is out of service. Before beginning to determine the minimum outage volume for the system, two assumptions have to be made. 1) The minimum number of hours the system must operate on storage alone, and 2) the demands during the outage. A typical assumption is that the system must operate on storage alone for six hours at average day demands. These assumptions can be anything, but the system's emergency management plan must coordinate with it.



The Three Components of Storage

Having a system that can only run for one hour on storage with a response plan that calls for emergency generators to be set up within 12 hours is a recipe for trouble.

Once these assumptions are determined the calculated minimum storage volume is easily done using the following equation:

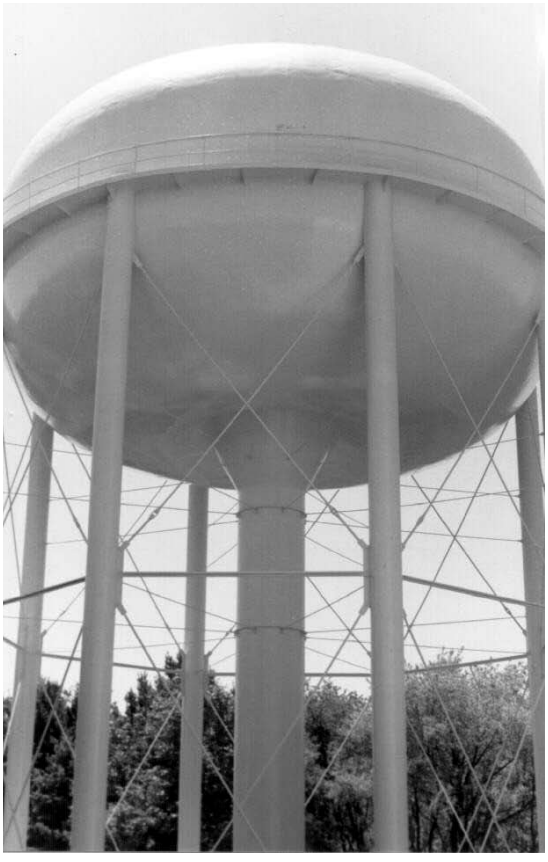
Demand (gpm) * Outage Requirement (hours) * 60 (minutes/hour) = Required Volume (gal)

The same time units must be used for the demand and outage in order for this equation to work correctly. The equivalent equation for demand in millions of gallons per day (MGD) is also provided:

Demand (mgd) * 1,000,000 gal/mil gal * Outage Requirement (hours) / 24 (days/hours) = Required Volume (gal)

For example, using an assumption of 6 hours with an average day demand of 2 mgd (1400 gpm) the required emergency outage volume would be:

(2 mgd) (6 hours) (1,000,000) / 24 = 500,000 gal of required outage storage volume



Fire Protection

The next component to be studied is fire protection. Fire protection usually is the dominant component in smaller systems. This component is sized by determining the design fire in each district and making sure the system provides this.

The design fire is an assumption based on a number of factors. The main sources for this information are local fire departments' requirements and organizations like ISO, Inc. that publish fire protection data. ISO also will review a system and evaluate it against its baseline fire protection criterion to determine how effective it is. The ISO report can be a great resource for selecting the proper design fire for a utility. ISO states that the maximum fire flow rate a community water system is expected to provide is 3,500 gpm for three hours. This is a common starting point for this analysis.

Once a design fire has been chosen, the storage analysis can begin. The first step is to determine how much of this required fire flow rate can be delivered by system pumping. The equation is as follows:

Firm Pumping Capacity (gpm) – Maximum Day Demands (gpm) = Pumping Capacity available for fire protection (gpm).

The next step is to determine the portion of the design fire that will need to be delivered by system storage using the following equation:

(Design Fire Flow Rate (gpm) – Available Pumping Capacity (gpm))*(Design Fire Duration (hours))*(60 minutes/hour) = Required System Storage (gal)

For example, if a design fire of 3,500 gpm for three hours was chosen and the firm pumping capacity was 1,000 gpm and the maximum day demands are 500 gpm the rest of the analysis would be as follows.

1,000 gpm - 500 gpm = 500 gpm of system pumping capacity available for fire protection

(3,500 gpm – 500 gpm) (3) (60) = 540,000 gal of required fire protection storage volume.

continued on page 8

continued from page 7 - average day

Operational Storage

The final component is operational storage. Operational storage includes the storage volume utilized for the daily turnover of the tank as well as maximum hour balancing. Tank turnover is a tool used to keep the stored water fresh. Current industry practice and the Ohio EPA's recommendation is to turnover 20% of the tank every day. Theoretically, this means that the stored water is never more than 5 days old. This assumption is not always true due to poor tank mixing, but it is the current practice.

Balancing is the storage required to supply demands over the system's pumping capacity. This only happens when the demands are greater than maximum day since the pumping capacity has to be able to supply maximum day demands. The magnitude and duration of these peak periods can be determined from flow and tank records or a conservative assumption can be made. A typical industry assumption is as follows:

[Maximum Hour Demand (gpm) – System Pumping Capacity (gpm)] * 8 hours * 60 (minutes/hour)

For example, if maximum hour demands are 2,000 gpm and the firm pumping capacity is 1,000 gpm the following is true:

(2,000 gpm – 1,000 gpm) (8 hours) (60 minutes/hour) = 480,000 gal

Total Required Storage Volume Per District

Once the three component volumes (fire, outage, operational) are calculated, the total required volume in each pressure district can be determined. There are several ways of doing this.

The first, most conservative way is to simply add the three components together. This implies that the system would be able to handle a simultaneous fire (as large as the design fire), an emergency outage (as long as the assumed outage duration), balancing a maximum hour event, and the standard daily turnover. It also could handle, independently, a larger than designed fire, outage, or balancing event. This is the most costly approach.

Using the examples provided earlier, this would equate to:

540,000 gal for fire + 500,000 gal for outages + 480,000 gal for operations = 1,520,000 gal of required storage

A second, less conservative alternative would be to add the operational component to the larger of the two volumes for outage and fire protection. This would imply that the system could handle all the events listed in the last paragraph except simultaneous fire and outage events. Using the examples provided earlier, this would equate to:

540,000 gal for fire and outages + 480,000 gal for operations = 1,020,000 gal of required storage

The least conservative version would be to simply size the required tankage on the largest of the three components. This would mean that the system could not handle any of the listed events at the same time. Using the examples provided earlier, this would equate to:

540,000 gal for fire and outages and operations = 540,000 gal of required storage

The decision to use any of the three methods needs to be made by the utility with its emergency management plan and capital improvements budget in mind. Future expansion needs to be kept in mind as well. As demands increase in a district, all three component volumes also can increase. Typically the emergency outage component is the most affected.

One final parameter that needs to be reviewed before the analysis is completed is whether the district has enough average daily demand to turnover the required storage. It's possible to add the three components up in a way that produces more than five times the average daily demand. If this happens, the system will not turnover 20% per day and will generate theoretical water ages older than 5 days.

Final Steps

Once all the analysis and data collection is done, remedies can be determined for deficiencies discovered during the process. This is where

creative and thorough engineering can be very effective. Any problem discovered can be solved by a combination of increased pumping capacity, increased storage volume, or even reduced demands in some cases. There are advantages and disadvantages to each. Increasing pump capacity may solve a fire flow problem economically, but still could be plagued by power or mechanical failures. Increasing the storage volume in a district would increase emergency outage capacity without fear of mechanical or power-related failures, but is expensive and might have siting issues. Reducing demands in a district usually is not possible unless customers can be shifted to another neighboring pressure district. This may only provide a temporary solution, but it might cost very little and could be implemented very quickly.

Another consideration is redundancy and flexibility in operations. How would the system operate if the tank or a booster station had to be taken out of service? How would service be maintained to the customers? Questions like these might lead to solutions such as multiple smaller tanks in a district instead of one large tank, or multiple pump stations instead just one.

This step by step process will help any utility make smart economical decisions about its system's storage needs. It will help prevent mistakes like providing too much storage, not providing enough fire protection, storage in the wrong places, and many other common problems in distribution systems. This system could save a community large capital investments and embarrassing mistakes with only a small planning effort.

To make this even easier, a preformatted spreadsheet is available from the author, Dan Barr, PE. The spreadsheet performs all the calculations mentioned above in an easy to use format. Please email the author at dbarr@burnip.com for a free copy. For more information on this topic, join Dan as he presents this material during the 2007 Ohio AWWA State Conference.

BURGESS & NIPLE

Dan Barr, PE has been a design engineer at Burgess & Niple, Inc. for more than 12 years. His experience includes planning, modeling, designing, and performing construction services on water distribution and treatment systems throughout Ohio and surrounding states. Dan earned a Bachelor of Science in Civil Engineering from Case Western Reserve University in Cleveland, Ohio.

Ohio Section Presents Science Fair Awards

Hosted by The Ohio State University, Columbus, at the French Field House and St. John Arena, the 2007 State Science Fair was held on Saturday, May 12th. Drawing upon a base of over 35,000 students at more than 1,000 local school science fairs, more than 1,000 students in grades 7-12 from nearly 300 schools were evaluated at the 2007 fair.

Among those entries, 33 applied for judging of their projects by the Ohio Section AWWA. These entries qualified for consideration by being "outstanding projects focusing on drinking water, analytical techniques associated with drinking water, and analyzing drinking water, or other subjects of interest concerning drinking water." This compared to 25 entries in 2006 vying for the OAWWA Awards. A total of $1,000 was awarded winning entries in two different divisions.
Tim Ray, chair of the OAWWA Public Outreach Committee, had great support from all districts in the judging of these entries. Judges were Don Freisthler, (Sidney), Danella Pettenski (Columbus), Tony Kohler and daughter Heather (Columbus), Tom and Linda Parsons (Troy), and Tim and Debbie Ray (Troy). Eighteen projects competed in the Grades 7-9 division, and fifteen competed in the Grades 10-12 division. There were some very good projects, and judging was both fun and difficult.

The Grades 7-9 award winners were: Ms. Kelly N. Tackett, Proctorville, 1st place ($200); Mr. Jack E. Gallagher, Centerville, 2nd place ($100); Ms. Theresia R. Gordnier, Centerville, Honorable Mention ($50); and Ms. Carol A. Rieth, Columbus, Honorable Mention ($50). Project title for the 1st place entry was Development of a bioluminescent assay for the detection of arsenic. The Grades 10-12 award winners were: Mr. Jyotiraditya Sinha, Uniontown, 1st place ($300); Mr. David JM Esber, Akron, 2nd place ($150); Ms. Stephanie M. Andrus, Richmond Heights, Honorable Mention ($75); and Ms. Victoria E. Ellis, Sylvania, Honorable Mention ($75). Project title for the 1st place entry was Developing a nanofiber filter to eliminate copper ions from water.

AWWA members wishing to volunteer for work with the Public Outreach Committee may contact the chair at tim.ray@troyohio.gov or by calling Tim Ray at 937-339-4826 (City of Troy Water Plant).

CITY OF COLUMBUS

Tapping Team Wins AWWA National Contest

Toronto, Canada, June 27, 2007

This year's annual American Water Works Association National Conference in Toronto was extremely rewarding for the City of Columbus. The Columbus tapping team won the prestigious 2007 AWWA National Tapping Contest with a winning time of 1 minute 17.06 seconds. This winning time bested 19 other teams including Birmingham (Alabama) Water Works (1:23:66) which had won the previous three (3) National titles and an astounding seven (7) out of the last eight (8) National titles. To qualify for the National Contest, the teams must win at the local AWWA Section level which Columbus did at the State Conference last September (winning time 1:16) in Cleveland.

The AWWA National Tapping Contest is a competition of skill, dexterity and teamwork in which teams (comprised of United States, Canada and International teams) work against the clock to manually drill into a 6" cement-lined, ductile iron pipe and install a ¾" tap. For those unaware, a water tap is a service provided by the City of Columbus to our residential customers. The water line is tapped (drilled) and copper piping is connected to provide water service. Though this service is not performed this quickly (1:17) in the field, the contest is a fun way to see who can successfully complete the tap and connection in the fastest time.

Teamwork, communication, and hard-work are vital in succeeding in such an event. Original members of the team have worked incredibly hard for over nine years and their perseverance has finally paid off by bringing the well deserved National Title to the City of Columbus. It is important to note that the team practiced, prepared and traveled to Toronto on their own time and expense.

The team proudly represented the Department of Public Utilities through the Ohio Section AWWA. They embrace the support given from the Ohio Section AWWA and the Division of Power & Water employees, and hope this continues and grows in the future.

Winning the event in Toronto automatically qualifies the Columbus team for the final round in next year's National Contest. The team will also represent the United States in the World Cup of Drilling & Tapping Contest. Both of these events will take place in Atlanta '08. The team is excited and eager to defend their title next year. It is uncertain if Pat, Mike and Bruce will ride their Harley's to Atlanta as they did in Toronto this year!

AWWA President Terry Rolan (right) and head judge Jeff Standridge (left) recognize winning Pipe Tapping Contest team members from Columbus Ohio, (left to right): Mike Spriggs, Craig Charleston, Bruce Farley, Chris Scott, Pat Crumley, and Mark Eppich. Photo by David Hathcox

This year's team members are:

Pat Crumley (cranker) – *GIS Analyst*
Mike Spriggs (copper) – *Engineer Associate III in Water Engineering*
Bruce Farley (feeder) - *Engineer Associate in the Survey section (Water Engineering)*
Mark Eppich (coach/cranker) – *Engineer in Training II with Water Supply group*
Chris Scott (coach) – *Engineer Associate in the Survey Section (Water Engineering)*