More than four-fifths of Wisconsin’s 585 public water utilities are small systems that serve fewer than 4,000 customers. The folks who run these utilities often are jacks of all trades, dividing their time between tending pump stations and fixing main breaks with plowing streets, inspecting sewer manholes and reading meters.

In 2009, WWA renewed its commitment to the state’s small-system water utilities by re-establishing the Small Systems Committee and developing programs to provide education and support for the operators and utility managers who do it all. WWA celebrates its Small System members each year at the Annual Meeting by presenting an award for Small System Excellence. This issue of the WWA Newsletter recognizes the achievements of the last four recipient utilities of this special award.

We asked representatives of the Brodhead Water & Light Commission, City of Darlington Water Utility, City of Seymour Waterworks and Village of Pardeeville to talk with the WWA Newsletter about the challenges and rewards of operating small utilities in Wisconsin. Here are their responses:

**BRODHEAD WATER AND LIGHT COMMISSION**

*Pat Sullivan, Waterworks Operator*

**NUMBER OF CUSTOMERS:** 1,150 services in use

**TYPE OF SOURCE WATER:** Groundwater

**NUMBER OF EMPLOYEES:** Superintendent, 4 Lineman / Operators, 2 Office Staff

**BIGGEST OBSTACLE YOU’VE OVERCOME:** (Still working on) Adjusting to the changes in the economy.

**MOST INNOVATIVE THING YOUR SYSTEM HAS DONE:** In 2008, we built a new operations/office building that’s 19,000 square feet, fully automated with radiant heat and two photovoltaic tracking solar arrays.

**IF I COULD CHANGE ONE THING ABOUT OUR SYSTEM, I’D...** Add more main to be able to service all of the homes in our community. We don’t serve some homes now because they would have prohibitively long service laterals.

**MY FAVORITE THING ABOUT OUR SMALL SYSTEM IS...** The town and the water system are laid out in all north/south, east/west block grids. It is a very easy system to work with as far as isolating mains and performing unidirectional flushing.

**SOMEDAY, I’D LIKE TO...** Replace our second old lattice leg 80,000 gallon water tower with a new elliptical tower.

**REGULATIONS ARE...** A necessity as long as they don’t become an overburden.

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**CITY OF DARLINGTON WATER UTILITY**

*Bob Salmi, Public Works Director*

**NUMBER OF CUSTOMERS:** 1,100 meters serving approximately 2,400 people

**TYPE OF SOURCE WATER:** Groundwater

**NUMBER OF EMPLOYEES:** Public Work Staff is six, including director

**BIGGEST OBSTACLE YOU’VE OVERCOME:** I had to overcome the fact that nothing had been done in years. Apathy was rampant and the attitude was persistent that nothing needed to be different. The system, while somewhat complicated, was largely misunderstood.

**MOST INNOVATIVE THING YOUR SYSTEM HAS DONE:** Telemetry and electronics improvements. Our

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Superstars continued on next page
Superstars continued from previous page

SCADA system lets us see in real time what we are doing with our two towers, two wells, two booster stations, and seven pressure-reducing valve stations. We data log pressures and tower levels. The telemetry also reads our chemical usage and calculates dosages. On the consumer side, we now are getting daily reads of the water meters. We are working with a Beta version of software that allows us to get leakage reports, and we’re close to getting a daily report that will tell us how many gallons of water were pumped versus what was sold. I am very excited about this as I should be able to tell if something changes quickly in our system. Other features are maintenance features for meters, hydrants, etc.

IF I COULD CHANGE ONE THING ABOUT OUR SYSTEM, I’D... get rid of more of the old undersized pipe and the lead services.

MY FAVORITE THING ABOUT OUR SMALL SYSTEM IS...dependent on which day it is. It is probably in our telemetry system when I call people and tell them they have a leak so they don’t have to waste water or money. It is great to have the technology!

SOMEDAY, I’D LIKE TO...Finish my water maps that I am making with the ARC MAP. I hope to get the rest of my curb stops in the mapping program.

REGULATIONS ARE...onerous but necessary. ♦

CITY OF SEYMOUR WATERWORKS
John Schoen, Utility Supervisor

NUMBER OF CUSTOMERS: 1,600+ connections serving 3,458 residents

TYPE OF SOURCE WATER: Groundwater, 2 wells

NUMBER OF EMPLOYEES: 3 full-time utility, however Department of Public Works employees also work regularly in the utilities.

BIGGEST OBSTACLE YOU’VE OVERCOME: We are currently under contract to design an iron filtration/radium removal facility which will be very welcome to our residents as we have very high concentrations of iron and we have been over the MCL for radium for the past two years. I believe this project, when completed, will give our customers confidence that our water is safe to drink as well as improve the aesthetic quality.

MOST INNOVATIVE THING YOUR SYSTEM HAS DONE: We have installed a very comprehensive SCADA (Supervisory Control and Data Acquisition) system which allows the employees to have greater flexibility in operating/maintaining/troubleshooting our facilities. This allows more labor hours for more detailed special projects.

IF I COULD CHANGE ONE THING ABOUT OUR SYSTEM, I’D...choose to not be located on a limestone shelf formation. This may sound simplistic, but we have so many positive things in Seymour, like plenty of quality groundwater (other than the above mentioned radium issue!) to meet our needs and Councils that support the necessary repairs and capital improvements, however the fact that the City of Seymour is located on a limestone shelf creates problems that are hard to overcome, especially in regards to distribution system failures and water loss. Many times we will know we have a system leak, but cannot locate it due to the fact that the crevices in this limestone allow the water to run underground rather than come to the surface for easy identification/repair, which then shows up as “lost” water to the Wisconsin Public Service Commission. This is an issue we deal with almost continuously.

MY FAVORITE THING ABOUT OUR SMALL SYSTEM IS... that although we only have 3 full time utility personnel, our Department of Public Works (8 full-time) works very closely with us to maintain our distribution system, and distribution problems are handled collaboratively to help maintain internal efficiency.

SOMEDAY, I’D LIKE TO...have our customers really understand what it takes to operate these types of facilities. These facilities are costly to build, operate, and maintain, yet few really know what happens before they turn on the faucet.

REGULATIONS ARE...here to stay! Even though we do not always agree with all of the regulations, they do provide for a means to open communication between the regulatory agencies and the municipalities so that a solution can be found that is usually in the best interest of the customers. ♦
VILLAGE OF PARDEEVILLE
David Tracey, Public Works Director

NUMBER OF CUSTOMERS: 984 customers

TYPE OF SOURCE WATER: Groundwater (3 wells)

NUMBER OF EMPLOYEES: 11 employees, all of whom are shared with other operations including electric utility and sewer.

BIGGEST OBSTACLE YOU’VE OVERCOME: In June 2008, a storm knocked out our electrical and wastewater operations, then as we brought power back the next day, our wastewater plant started seeing extremely high volumes because of storm infiltration. That’s when the flooding came. Park Lake overflowed over Highway 22, half the community was out of power because of the flooding, and we were trying to sandbag the road to create a flume, keep the power running, deal with the wastewater plant and maintain the water utility. Through it all, we were able to keep the well pumps running and the water system operating, even though we had one well house down for refurbishing.

MOST INNOVATIVE THING YOUR SYSTEM HAS DONE: When I started here, we accounted for only 76 percent of our water. Now our losses average between only 1 and 3 percent annually. We did all kinds of things to make everything right, from listening on all hydrants and services to changing out meters to testing meters. We’ve gone through all our hydrants and literally got every one working where we couldn’t get them to work before. One of the big challenges we wrestle with is the new technology with the meter reading, especially because of changes in the electric service meters. All the drive-by equipment we’ve had to buy in the last five to seven years is only going to work on the water, not electric, meters. But we’ve done a good job of designating funds and putting money aside to get all the equipment compatible. We’ve put a lot of attention on the maintenance side of our water utility. Anything that needs to be done, we do it. We do our own repairs, our own maintenance, even our own utility installations for shorter stretches, and all the guys are trained properly with a good safety program. We’ve got everybody in public works on board with electric, water, and sewer.

IF I COULD CHANGE ONE THING ABOUT OUR SYSTEM, I’D...struggle to come up with something. We’ve really put everything in good shape in the last 10 years and I don’t know if there’s anything I would change.

MY FAVORITE THING ABOUT OUR SMALL SYSTEM IS...we have only one hydrant installed throughout our system. They’re all the same brand, which makes maintenance and operations easy.

SOMEDAY, I’D LIKE TO...win the lottery.

REGULATIONS ARE...good because they protect the environment, but I think sometimes we go too far with overregulation on unfunded mandates. ✤

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Visit www.waterstarwisconsin.org

The Water Star Program guides, inspires and recognizes communities that take exemplary actions to protect, improve, and enhance their local waters.
Growing a Synergy Between WWA and its Small Utility Members

Welcome to this inaugural Small Systems section of the WWA Newsletter! We hope this will be just the first of many new initiatives that WWA will launch specifically to address the needs and interests of our silent majority – the small-system water utilities that make up more than four-fifths of Wisconsin's public water suppliers.

If you're not affiliated with a water utility that considers itself small, please don't skip past the Small Systems section. You just might find some information in these pages that you can use, regardless of whether you're a one-man operation or one of the largest utilities in the state.

So what is a small system? It depends upon your point of view. For some of our WWA members, a small system can be defined as a utility that serves less than 3,000 customers. For others, it's a utility that shares personnel with other public works divisions of a municipality or relies on a single operator to keep things running. The WWA Small Systems Committee prefers to leave it up to you to decide whether your utility considers itself small. Definitions can get in the way of our real objective, which is to provide resources, education and networking opportunities that meet the needs of all our members, regardless of size or complexity.

A little more than a year ago, the WWA board of trustees made the commitment to put more resources into serving our small systems by reactivating the Small Systems Committee. Since then, the committee has done a great deal of planning and strategizing, inviting input from small system representatives who have been involved with WWA as well as those who didn't even know the association existed, and mapped out a series of objectives that we're beginning to put into action this spring.

Here are some of the things we've heard our smaller-system members struggle with and can use more assistance in addressing:

- Because of limited staffing resources, it can be hard to get involved with WWA committees or to attend WWA seminars. The best training programs for smaller system operators are those that give hands-on experience and CEU's without requiring a lot of travel, overnight stays and registration money.
- Small-system operators face daily challenges keeping their utility commission members educated about water infrastructure needs and issues, and a good relationship between commissioners and utility staff is critical to getting the money and support needed not only to improve water infrastructure but to maintain them.
- Small systems staff members sometimes feel cut off from professional water organizations because their experience and knowledge may be quite different from staff at larger utilities, which have the resources to be involved. Where a major utility may have dozens of staff and managers overseeing areas such as diverse water quality, source protection, media relations, technical resources and administration, a small system superintendent may be single-handedly responsible for all these areas, as well as other non-utility responsibilities. It can be difficult to identify the common challenges small and large utilities share when their operations are so different.

Our Small Systems Committee, composed of long-time members as well as brand-new volunteers, wasted no time rolling up their sleeves and figuring out how to address these concerns. Thanks to the tireless energy and enthusiasm of our committee, we've begun to implement programs and initiatives to make our small system members feel more at home in WWA and able to take advantage of the resources available not only through Wisconsin but through our parent organization, the international AWWA.

Here are a few of the first steps the Small Systems Committee has committed to taking:

- In late May, WWA will host an inaugural day-long Small System Water Workshop at the Omni Center in Onalaska, where participants can spend one day roaming from station to station and taking part in hands-on, mini-seminars on chemical treatment and sampling, meter repair, confined entry, cross-connection inspection, DNR reporting, hydrant repair and a host of other topics. The workshop will be capped with a networking happy hour to allow participants to talk with exhibitors, session leaders and colleagues informally about shared interests and challenges.
- This year's Annual Meeting in September will feature a tract focusing on issues of particular interest to smaller systems, and will tentatively include topics ranging from equipment repair and water loss evaluation to public relations and developing relationships/providing education to governing commission members. In addition, the Small Systems Committee will host a reception for our small-utility representatives.

Synergy continued on page 22
What’s a Good Chlorine Disinfection Level for Your System?

By: Charlie Cameron, P.E., WDNR Environmental Engineer

Chlorine is a highly effective disinfectant used in water supplies for more than 100 years. Life expectancies have increased as a result of its use. More recently, chlorination has become the treatment method of choice in addressing virus concerns at drinking water facilities with groundwater supplies.

Dr. Mark Borchardt, a well-respected research scientist from Wisconsin, proved that our ground water supplies are susceptible to virus contamination. His research further shows that these viruses are reaching consumers and causing various types of illnesses - flu, colds, intestinal, etc. This can be a lethal situation for those in our communities with other serious health problems. State drinking water code changed last year in recognition of this and now requires mandatory disinfection in Wisconsin.

The American Water Works Association (AWWA) published a short brief a couple of years ago on disinfection entitled Drinking Water Disinfection and Utility Choice of Disinfectant. It covers many of the parameters operators have to deal with in regard to selecting a disinfectant and discusses various disinfection methods. It describes “free” chlorine as “extremely effective” for bacteria and “highly effective” for viruses. These are two good reasons for its use besides being easy to obtain, administer, monitor, and providing protection throughout the entire water system. While combined chlorine disinfection has a niche in the water treatment market, it is not as widely used or practiced in Wisconsin.

Free chlorine, though, is not a free commodity you can pick up at the local five-and-dime with your morning cranberry muffin. It is free because it is not chemically attached to other molecules... such as ammonia. In water, chlorine exists in both a “free” and “combined” state as described in the following equation: \( \text{total} = \text{free} + \text{combined} \). Since free chlorine is a more effective disinfectant, most utilities practice “break-point” chlorination and measure free chlorine levels regularly. Chlorine is added to the system until a free, stable residual is obtained. So the million dollar question becomes, what is a good target level for your system?

You the operator will need to make this call... with some guidance. All water systems in Wisconsin are now required to maintain detectable chlorine residuals throughout the distribution system. Since most water operators are using the DPD Colorimetric method to measure free chlorine and this is an approved method (Standard Methods 4500-G), one may think the “minimum detectable” level of 0.01 mg/L as Cl2/L described in the method is a good target level. However, Standard Methods qualifies this figure as being under “ideal conditions”. Instrument companies, such as HACH, recognize this and describe their detection ability in similar fashion. The colorimeter instruction manual of one company lists an “estimated detection limit” of 0.02 mg/L; which has some ambiguity as well. One needs to recognize that a detection limit is a moving target... which is probably not a good thing from a code standpoint.

Commercial laboratories are required to calculate detection limits on a regular basis and report them to their client as an LOD (Limit of Detection) or MDL (method detection limit). These can be influenced by many factors including the matrix tested, instrument used, analyst, and lab technique. This takes time, money, and statistical know-how. Fortunately, most seasoned operators practice break-point chlorination, not detectable-point chlorination so this topic can be sidelined.

Water professionals learn early that lack of consistent, free chlorine residuals means customer complaints due to odor/taste caused by combined chlorine. While we need to have adequate chlorine residual to keep bacteria counts down and to de-activate viruses, for all practical purposes, addressing aesthetic issues by practicing breakpoint chlorination will require a residual at least 10 times the detectable level. The bonus is that break-point levels provide good protection against most pathogens and should meet all “detectable” definitions.

Many water systems treating groundwater in the state have found their aesthetic “sweet-spot” to be at least 0.20 mg/L free chlorine, which is, incidentally, the level required in groundwater systems influenced by surface water or having difficulty producing safe water. In fact, in Western Wisconsin where I am from, most operators keep their free chlorine residual at about 0.40 mg/L on average to minimize aesthetic complaints. Another fact to mention, it is not uncommon to see systems with free chlorine residuals of 0.50 to 1.00 mg/L with excellent aesthetics. These levels most certainly meet the definition of “detectable” in the code and may even be high enough to meet 4-log virus removal in some cases. If you hover at the detectable level, you may not have adequate gemicidial protection throughout your system at all times and you most likely have customers that despise the taste. Breakpoint chlorination will solve both problems and will most likely have free chlorine much higher than “detect”. ☹
This new section in the WWA Newsletter is intended to provide a forum for small systems issues. Rather than create a separate newsletter for our smaller-utility members, we’ve incorporated it into the full membership publication to open the dialogue between all water professionals in WWA. After all, we’re all in the same industry, regardless of the size of our system, and we’re all governed by the same rules and regulations. There’s plenty we can learn from each other, and lots more that we have in common that we may realize on first blush.

The WWA Small Systems Committee looks forward to developing more programs and opportunities that benefit our state’s small utility representatives, and we welcome your input and involvement as we make the association and its resources invaluable to all its members. Please feel free to contact me or any of the committee members listed on the WWA website’s committee page to offer your thoughts or to get more involved.

WWA SMALL SYSTEM WATER WORKSHOP

A hands-on program for utility staff to learn more about keeping a small utility on track and in compliance

May 11, 2011 – The Omni Center, Onalaska
9 a.m. to 3 p.m.
$25 for non-members, $20 for WWA members

Topics include:
Waterquality sampling, Confined entry, Chlorinemetering, Excavation and trenching, Crossconnection inspection, Meter selection and testing, Unidirectional flushing, DNR reporting, Hydrant repair, Pump and motor maintenance, Water loss locating, Water loss management.

Sessions will be held concurrently every hour, allowing participants to attend multiple stations during the day. Additional exhibitors will be present to provide information and answer questions. Lunch will be served.

A prize drawing and networking reception will be held at 3 p.m. to give participants an informal opportunity to talk with exhibitors and colleagues.

For more information and to register for the conference, please visit the WWA website at www.wiawwa.org.