

Breeze

Issue 173 • Spring 2018

Anatomy of a Water Theft



Inside:

Water Plant in St. Martin
Governing Board Highlights
Jordan Valley Water

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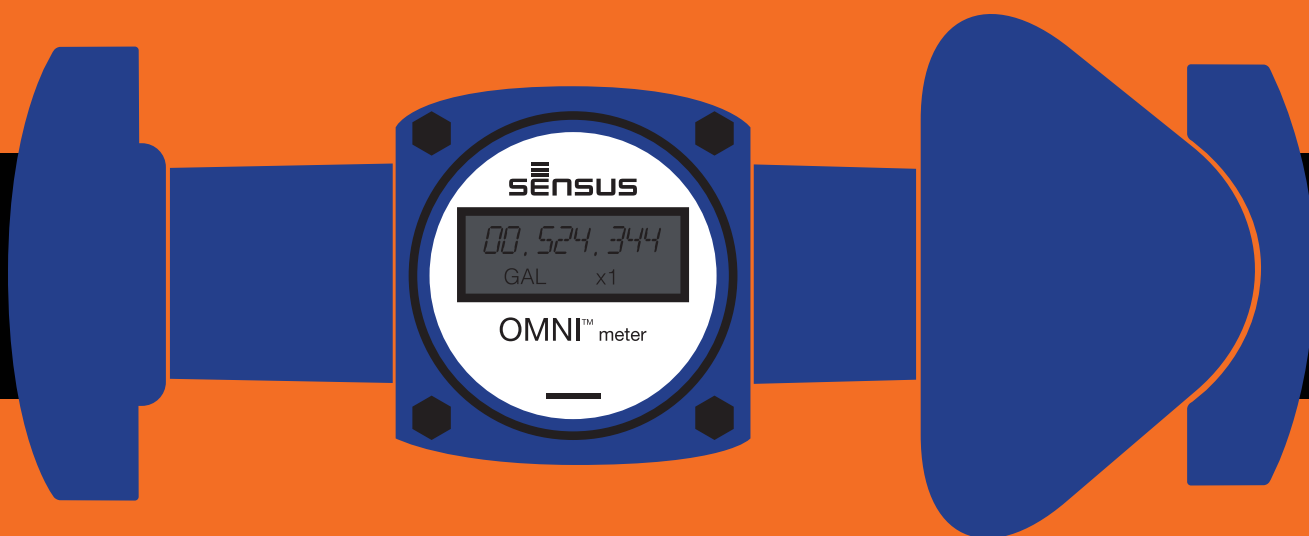
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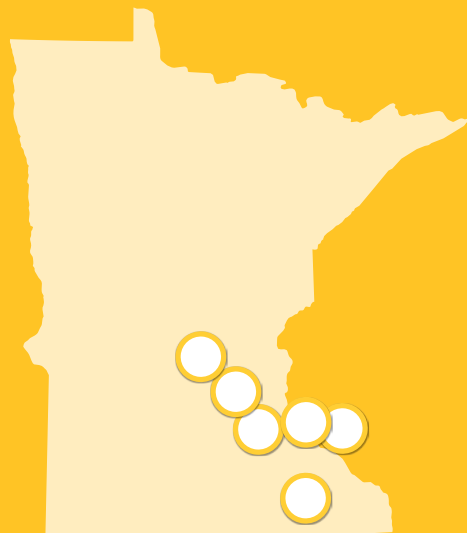
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Pricing for the Full Cost of Water



Dave Brown

The amount I paid for water at my suburban home in 2017 was 30 percent less than what I paid in 2016. That was the net effect of me using 32 percent less water and my utility increasing my water rates by 2 percent. I've started to only turn my in-ground irrigation system on when it needs it. Last year I ran my sprinklers once. In 2017, my wife and I paid \$230 for 44,000 gallons, which is an average of 60 gallons per person per day (gpcd). We've been working for years to reduce our water use and have made great progress since 2013, when we averaged 128 gpcd.

This is good news to my pocketbook. Good news for the environment too, right? Less energy and less chemicals needed to

produce the water I need. Unfortunately, it's bad news for my utility. That's because, as most of us in the water industry know, the traditional way of designing water rates doesn't cover the full cost to supply the water. We've generally designed our rates to just cover our costs to operate and maintain our systems during an average year. But our customers don't know this. They don't know that their 30 percent savings last year, along with all their neighbors 30 percent savings, meant that their utility won't have needed funds for next year. Perhaps, we think to ourselves, if we just postpone some work, like repainting Water Tower #1, we will be able to get by until a drought happens and water use and revenue goes up again.

But don't count on more droughts in Minnesota. At a presentation I saw last February by senior climatologist, Kenneth Blumenfeld from the University of Minnesota, Minnesota is noticeably trending wetter and warmer in the winter.

We need to be vocal and let everyone know of the need to change how we collect water revenues and the repercussions if we don't. We need to work together to educate our mayors, councils, city managers, planners, and residents about the true cost to supply water and what will happen if we don't start now. If we come together as a common voice on the importance of charging the true cost of water, we can make it happen. •

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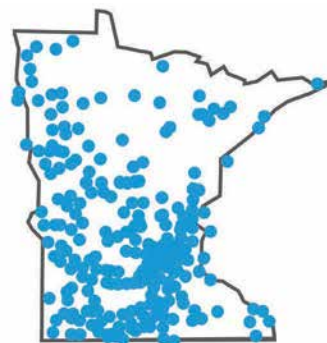
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Pete Moulton

Changing of the Guard

What is common in our industry is the annual election process held at the winter board meeting when the board of directors from the American Water Works Association (AWWA) elects new leadership. Leaders are put in place that will impact our future in the water world, a process I call the "changing of the guard."

As your section director and elected board member, I had the privilege to listen to the candidates and discuss with them their credentials. While the process of electing a new president isn't as elegant as the British pageantry guarding Buckingham Palace, it is a sign of the testament and commitment of water professionals who have a passion for water and who rise to lead others through challenges and obstacles of the industry.

The AWWA Board of Directors selected Jim Williams of Mishawaka,

"While the association fills openings and leadership positions, it reminds me of how our section also goes through a similar process."

Indiana, as our next president-elect. Williams has been an AWWA member for over 30 years and has served the Indiana Section in a variety of leadership roles. Also elected were two highly qualified vice-presidents. One is Randy Moore, who has been a member of AWWA for 35 years in the Missouri Section. Randy serves as the association service provider director-at-large; he is director of sales, agency development, and industry affairs for Tnemec Company in Kansas City. Also elected was Theresa O'Grady, a member of the Illinois Section for over 20 years. Theresa is currently the Illinois

Section director and is involved in several committees. O'Grady is a group manager of water resources at Crawford, Murphy & Tilly, Inc. in Aurora. Both Randy and Theresa currently serve with me on the board and are well qualified to represent the AWWA.

The final election was for director-at-large in which Keisha Lisbon Thorpe was elected. Thorpe is a watershed director at the city of Atlanta and has been a member of AWWA's Georgia Section for over 15 years. Active at her section, she launched the Georgia Diversity Committee and also helped to launch the Model Water Tower Competition Committee.

While the association fills openings and leadership positions, it reminds me of how our section also goes through a similar process. We also have a nominating committee that actively seeks out qualified individuals and volunteers willing to serve our section. Many have years of experience as volunteers in the industry and years of experience leading people. But the one thing that rises to the top is that our leadership has provided opportunities for each of us to grow. We can mentor younger professionals, we can share our passion for the industry, and above all we can listen. Our water future will be shaped by those who are willing to lead and those who are willing to listen.

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Stew Thornley

Hometown Hospitality

For a number of years we have been working with the good folks at Craig Kelman & Associates in Winnipeg to take whatever articles and such I send them and turn it into a professional publication that represents our section well. On top of that, Christa Campbell of Kelman extended fine greetings to a visiting Minnesota Department of Health engineer, David Rindal, when he went to Winnipeg in January for the Red River Basin Conference.

David (known to readers as the sporadic guest columnist with "Dave's Thoughts") was able to escape the Twin Cities on Monday, January 22 on only one of three planes that made it out that afternoon/evening because of a snowstorm. The next morning Christa picked him up and took him to the Winnipeg water treatment plant, where she had arranged a tour.

From left to right in the photo are David Minor, water treatment and operations engineer; Don Merredew, water treatment operations supervisor; Christa; and David, who said he learned how a city in the #truenorth responds to the challenges of

its climate. He will be writing an article on his adventures that will appear in a future *Breeze*.

Meanwhile, in this *Breeze*, you'll read about a new water treatment plant in central Minnesota that emerged from community commitment and collaboration. The city of Golden Valley came to the rescue to keep water flowing to a hospital after a snafu caused by a private contractor. Water Bar has a grand opening – and you can be a part of the fun. Lewis & Clark keep rolling through Minnesota (and next year construction will begin on a shrimp factory in Luverne because of the water made possible by this project). Who's coming and

who's going in the industry? Read and learn. Finally, be taught and titillated by a situation Rick Wahlen had in Eden Prairie, featured here as *Anatomy of a Water Theft*.

By the time you read this, you'll be over the Vikings' meltdown in Philadelphia (What am I saying? Vikings fans never get over anything) and reading about the Twins and their promising season with a beefed-up bullpen. You'll also be preparing for another playoff disappointment by the Wild as well as a playoff appearance by the Timberwolves for the first time in 14 years.

It's a great time to be a Minnesotan, and it's always a great time to be a Minnesota AWWA member. •



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November 2017 Governing Board Meeting

Recap of 101st Annual Conference

The conference, held in Duluth September 12-15, had an estimated 617 registrants, including 95 exhibitors. A preliminary financial tally shows approximately \$114,000 in revenues and \$66,000 in expenses for a profit of \$48,000. Keynote speaker Erik Therwanger was well received; he was rated 5 out of 5 by 82 percent of the poll respondents. Feedback on the Thursday evening dinner indicates that many think it is too long and not appealing to the next generation of water professionals. The board will discuss ways to modify the event to appeal to young professionals while maintaining the section's traditions. The Friday morning session, which included state auditor Rebecca Otto, was well attended, and the program committee was commended for its efforts to improve this program. The program committee has already been meeting to plan the 2018 conference, which will be September 18-21 in Duluth.

Conference Council chair Rob Isabel moved that the section automatically

increase conference registration fees on an annual basis to account for inflation and increases in cost to hold the conference. The proposal was to increase the fees based on the prior year's Consumer Price Index or 3 percent, whichever is less.

Educational Workgroups

Bo Johnston, chair of the Education Development Committee of the Training and Education Council, reported on the educational workgroups within the committee. They include the Operation Certification Training Workgroup, chaired by Jeanette Boothe. This workgroup was created at the 2016 annual section conference and includes, as members, Rick Wahlen, Bert Tracy, George Kraynick, Jon Eaton, Keith Redmond, and Eric Volk. The workgroup is creating a program to replace the training that was done in past years by John Thom, who is approaching retirement. The section wants to have an option developed to continue on this work.

Another workgroup is the Drinking Water Institute for Educators, which

held its 18th Institute for Teachers in August in Lakeville. As a follow-up to the three-day workshop, the teachers met again on a Saturday in late October at St. Paul Regional Water Services. The 2018 Drinking Water Institute will be held August 6-8 at Rochester Public Utilities.

Social Media

Chair Pat Shea of the Social Media Committee reported that the total reach of the section's Facebook page in October was 11,979 people, 98 page views, 472 people engaging with content, and 6 new likes to the page. Twitter has 17,300 tweet impressions, 322 profile visits, 7 mentions, and 13 new followers.

Board Reorganization

Chair-elect Eric Volk reported on the ad-hoc committee that is exploring options and developing recommendations for the board to consider in reorganizing the section organizational structure in a manner that is more in alignment with AWWA at the association level. •

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February 2018 Governing Board Meeting

Conference Council

Conference Chair Rob Isabel reported that contracts with the Duluth Entertainment and Convention Center (DECC) and room blocks with hotels are all set for the 2018 Minnesota AWWA Conference September 18-21. The council is discussing ways to shorten the Thursday night Member Appreciation Dinner to make it more appealing to younger members and operators. Roger Scharf, chair of the council's Program Committee, has lined up explorer Will Steger to be the keynote speaker

Social Media

Pat Shea reports that in January Minnesota AWWA reached 31,788 people on Facebook and had 1,075 of them engage in some manner (like, comment, share). The section also had 52 new likes to the page. On Twitter, the section had 19,300 impressions for the month, with 241 profile visits, 9 mentions, and 12 new followers.

Secretary-Treasurer Audit

An audit occurs with each change of the secretary-treasurer. Last September Anna "A. J." Schliep succeeded Ben

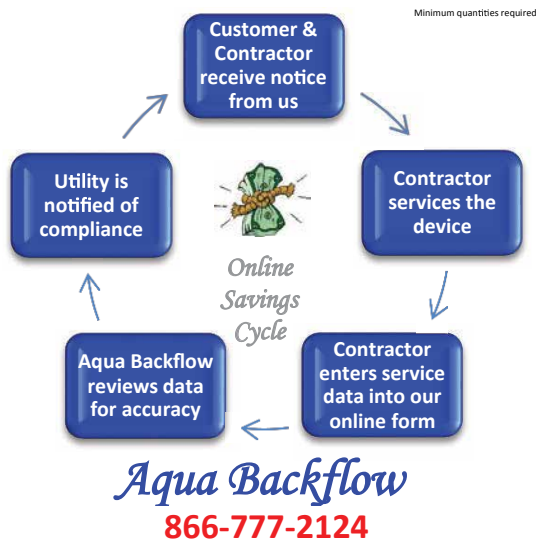
Feldman as secretary-treasurer, and the audit process is underway (ignore the rumors that Ben has moved to Brazil).

Memo of Understanding

The board approved a memo of understanding between Minnesota AWWA and the Minnesota Department of Health (MDH) regarding joint-training. The section and MDH have been involved in jointly organizing district water operator schools for more than 25 years and have worked to update the relationship with this memo. •

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From the *Waterline*, newsletter of the Minnesota Department of Health

Water Bar Opens New Storefront

Water Bar – a combination of water, art, and social infrastructure that has been a hit across the state has opened a new storefront at 2518 Central Avenue NE in Minneapolis. With ‘watertenders’ serving water from various cities, Water Bar has been on site in many locations, including the State Fair and the annual conference of the Minnesota Section of American Water Works Association. With a permanent location, Water Bar is now open every Saturday. As visitors sip the water, they’re treated to artwork and ecology displays within the studio. Water



professionals from around the state are invited to bring their water and tell the story behind it while serving a shift as

a ‘watertender’ at Water Bar. For more information on how to get involved, go to www.water-bar.org/volunteer. •

Golden Valley Survives Contractor Accident Without Water Disruption

A watermain break caused by a construction accident in Golden Valley threatened services to Regency Hospital last fall. The break occurred Monday morning, November 13, 2017 when a contractor punctured an 18-inch concrete pipe while installing a water line for snowmaking equipment at nearby Theodore Wirth Park.



Golden Valley water superintendent Joe Hansen said the hospital was the only customer between the two 18-inch valves where the damage occurred. In between is a 6-inch valve, which the city used to continue to supply the hospital with water as it constructed a bypass pipe. Staying in touch with Minnesota Department of Health (MDH) engineer Brian Noma and others, city crews constantly monitored pressure in the basement of the hospital. Hansen said the pressure stayed between 30 and 40 pounds per square inch, well above levels that could cause a concern regarding backflow.

The city completed the temporary service the same day, disinfected the pipe, and sampled the water. The results, which came back the next day, were good, and the water was turned on. However, some type of water hammer occurred, bursting the pipe and requiring another round of disinfecting and sampling. It wasn't until Wednesday when the city could begin operating the bypass.

Hansen said they only throttled down the 6-inch valve, rather than risking any negative pressure by turning it off completely, as they began repairs on the primary main on Friday morning. Since the hole was dug and the pipe was exposed under pressure, there was no need to send a sample off to the lab for a bacteria sample, as long as the section of new pipe and fittings were disinfected. The city flushed the main, tested for chlorine residual Friday night, and was able to resume its normal supply to the hospital.

A drinking water advisory for a hospital could cause a major problem, but the city was able to keep the water flowing, and Regency Hospital was able to continue operating in normal fashion.

Fortunately, because of the response of city utility workers, hospital staff, and others, Golden Valley and Regency Hospital were able to fix a serious situation caused by a private party without disrupting service. •

From the *Waterline*, newsletter of the Minnesota Department of Health

Unregulated Contaminant Monitoring Rule 4 (UCMR 4) Is Here

By Anna Arkin, Minnesota Department of Health

What is UCMR 4?

Every five years, the U.S. Environmental Protection Agency (EPA) implements the Unregulated Contaminant Monitoring Rule (UCMR) to collect data on contaminants that may be present in drinking water. The fourth round of UCMR, UCMR 4, requires monitoring for 30 contaminants between 2018 and 2020. The contaminants include 2 metals, 9 pesticides, 3 alcohols, 3 semi-volatiles, 3 brominated haloacetic-acid groups, 2 disinfection by-product indicators, and, for surface water systems, 10 cyanotoxins.

These contaminants are not regulated under the Safe Drinking Water Act. EPA collects results from across the country and decides if the contaminants occur at frequencies and concentrations high enough to be regulated.

More information is available at EPA's *Fourth Unregulated Contaminant*

"If your system is included, you were notified by MDH in 2017."

Monitoring Rule (www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule).

Which systems are included?

UCMR 4 includes all public water systems (PWSs) serving more than 10,000 people and some small water systems serving 10,000 or fewer people. If your system is included, you were notified by MDH in 2017.

What is the timeline for sampling and data reporting by the Minnesota Department of Health (MDH)?

Sampling started in January 2018 and will end in December 2020. Groundwater

systems will monitor twice, five to seven months apart. Surface water systems will monitor four times, three months apart (quarterly).

MDH will send results to participating PWSs as they become available.

What is MDH's role?

MDH, as it does with most regulated contaminant monitoring, will:

- Assume responsibility for sample collection. Your MDH district engineer will be collecting the samples.
- Pay for sample analyses using the MDH Service Connection Fee fund. (EPA will pay for sample analyses for small PWSs.)
- Ensure results are reported to the EPA and the primary contact at participating PWSs.

What is the PWS's role?

EPA required PWSs to report unregulated contaminants detected during UCMR monitoring in the Consumer Confidence Report (CCR) following the year they were detected. MDH will include UCMR4 detections in the CCR template we provide to your PWS. If your system wants to provide additional information, DWP technical staff are available as a resource.

MDH will include UCMR 4 detections in the CCR template we provide to your PWS. If your system wants to provide additional information to consumers, MDH technical staff are available as a resource.

Are there standards for the UCMR 4 contaminants?

Because the contaminants being tested are unregulated, no federal standards

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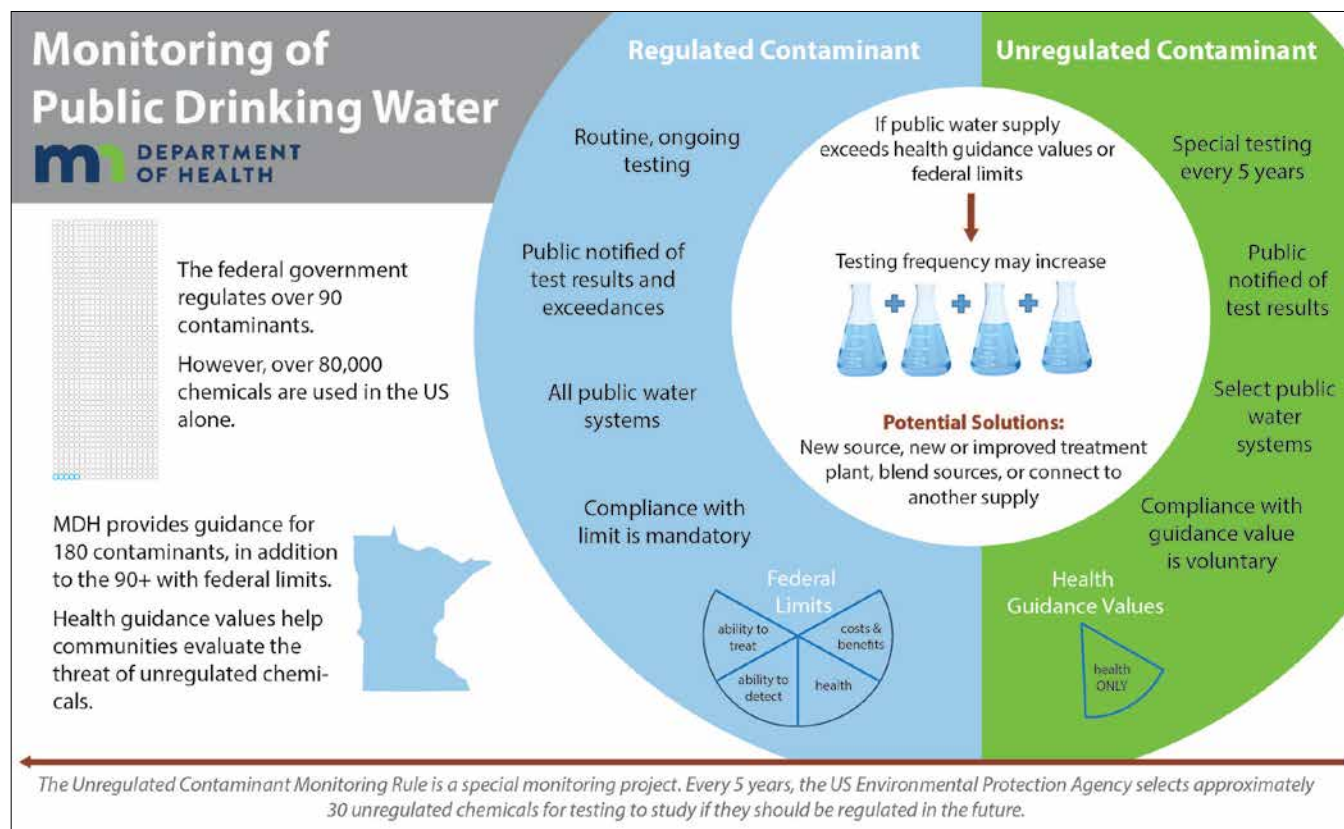
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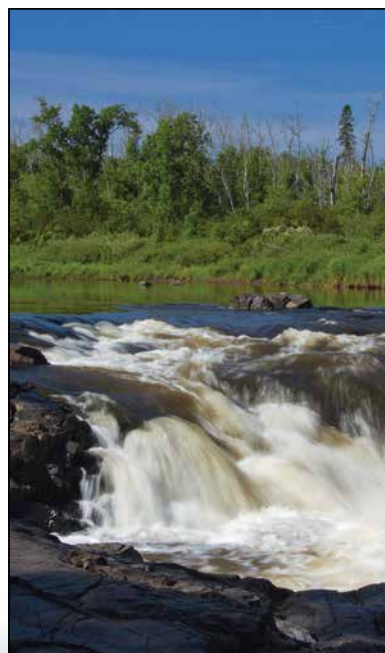


“Sampling started in January 2018 and will end in December 2020. Groundwater systems will monitor twice, five to seven months apart.”

for them exist. However, there is human health effects information available for some of the UCMR 4 contaminants.

- EPA's *Drinking Water Contaminant Human Health Effects Information*: (www.epa.gov/dwstandardsregulations/drinking-water-contaminant-human-health-effects-information)
- MDH's *Guidance Values and Standards for Contaminants in Drinking Water*: (www.health.state.mn.us/divs/eh/risk/guidance/gw/index.html)

If you have any questions, please contact Todd Johnson at 218-308-2110 or Cindy Swanson at 651-201-4656. We will provide updates as the UCMR 4 process continues over the next two years. •



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From the *Waterline*, newsletter of the Minnesota Department of Health

The Latest on Lewis & Clark

The Lewis & Clark Rural Water System connected to Lincoln-Pipestone Rural Water System (LPRWS) in November, making the system the 14th of 20 partners to be connected. The water started flowing upon completion of construction by LPRWS of over 20 miles of pipeline between Edgerton and Magnolia, the first of two connections for LPRWS, which serves a wide area that includes 38 cities in 10 Minnesota counties.

Conceived in 1988 as a way of serving water-challenged areas in South Dakota, Iowa, and Minnesota, the Lewis & Clark project takes water from a series of wells that tap into an aquifer adjacent to the Missouri River near Vermillion, South Dakota. The water is delivered to communities as far away as 125 miles.

“Conceived in 1988 as a way of serving water-challenged areas in South Dakota, Iowa, and Minnesota, the Lewis & Clark project takes water from a series of wells that tap into an aquifer adjacent to the Missouri River near Vermillion, South Dakota.”

The water first reached Minnesota in 2015, reaching Rock County Rural Water District. Since then, Luverne and Magnolia have also been connected.



Wall panels are installed for the Rock County reservoir.



Foundation work for the pump station in Worthington, which is expected to be connected to the Lewis & Clark Rural Water System by the end of 2018.

The water has allowed Luverne to be the site of Minnesota's first shrimp hatchery and harbor, a commercial-scale shrimp producer.

Next up is to extend the pipes to east of Adrian, another connection point to Lincoln-Pipestone, and then to Worthington. ●

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Anatomy of a Water Theft



BY RICK WAHLEN
Manager of Utility Operations, City of Eden Prairie

A family in Eden Prairie had its backyard pool re-lined with a heavy-duty vinyl “bag” glued to the inside of the pool to keep

the concrete from absorbing the water. The pool guy asks the father, “So how are we going to fill this thing? We need it to be full of water to put pressure against the

membrane to make it stick good and tight to the concrete.” The dad responds, “Will my garden hose work?” The pool guy says, “Do you have a hydrant nearby?” Dad: “As

"Call your boys over and have them hook up this hose to that hydrant, and we'll be full in no time!"

a matter of fact, there's one right across the cul-de-sac." Pool guy: "Call your boys over and have them hook up this hose to that hydrant, and we'll be full in no time!" So his roughly 13 year-old-son and his 9 year-old son unroll the 4-inch fire hose across the front yard and go back for advice on what to do next. Pool guy hands them a hydrant wrench and says, "Spin the cap off and screw the nose on just like a big garden hose, and then put this part of the wrench on the big nut on

top of the hydrant and come back and I'll tell you what's next."

An attentive neighbor must have noticed this going on about this time and called it police department, who dispatched an officer and contacted our office. I headed over to see for myself what was happening.

By the time I arrived, the police officer was in his car and the boys were rolling up the hose. The officer explained that he gets zero calls per year for things like this, and his supervisor told him all the people need is a permit to use water from a hydrant. I set him straight on that and then walked with the officer over to confront the father, who was sitting in the hatchback of his Volvo waiting for the boom to fall.


After a conversation in which I asked him what part of his plan included a means to measure and pay for the water ("Sorry, didn't think about that."), I asked if he knew that connecting a hose directly to a hydrant poses a backflow contamination risk if there was a pressure drop in the area? ("Sorry, I didn't know."). Has he been filling his pool like this before? ("No, we never had it repaired before, so we just topped it off with the hose every year.") "Can I meet your contractor? He knows better than this and should not have encouraged you to hook up to a hydrant." ("Don't be too hard on him. He's cheap and honest, and we really like him

because he doesn't rip us off like the other pool companies.") "Did you know that you are violating city ordinance on top of stealing water?" To this, the officer's ears perked up, and he said, "I'm going back to my squad car to write you up a ticket for the ordinance violation."


At this point the man tells me his wife is so embarrassed and he's in big trouble with her, too, and now that he's getting a citation, he'll never hear the end of it. The pool guy, a Jimmy Buffet look-alike who uses the word "man" as a familiar greeting to me and continues to use the word in every sentence, was the real target of my curiosity, because anyone in this business in Eden Prairie knows you don't do this sort of thing. As he's telling his story, I see that there are maybe 2,000 gallons in the pool, so the "theft" part was more about principal than economics. Pool Guy told me a story about how in Minneapolis they do this all the time, and the owner said that he just didn't think Eden Prairie would be any different than other places where he's seen it done, but he again was sorry and didn't want to make an excuse and offered to pay any fine and pay for the water. I pointed out that no city issues permits after the fact, so even if they thought it was allowed, I still gave them a lecture about public infrastructure, and how their neighbor wouldn't like it if he had helped himself to his neighbor's water, so

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why should the city (all of his neighbors) see it any differently? I told them about Chlorinated Water Supply to help them finish their project and then left them to go talk to the officer, who was in his car typing up the violation. I advised the officer that there's not enough water to pay for, and it seemed to me that the real culprit was the pool guy and that maybe he should get the citation. I said to the officer, "You might want to dig into this guy a little more and see what you find out, and try to keep tabs on him in case he comes up again for something fishy." I told the officer I thought it was pretty sneaky and lame that the pool guy got the kids to perform the illegal connection for him.

At that, I went to finish my talk with the owner while the officer took his clipboard over to the contractor.

This was so comically perverse that I had to share it. •

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I arrived, the
police officer was
in his car and
the boys were
rolling up the
hose."**

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COMMUNITY COMMITMENT

Results in Innovative Water Plant in St. Martin

One of the newest water treatment facilities in Minnesota is also one of the first engineered biological water treatment plants in the state. Some other cities, such as Hutchinson (<https://tinyurl.com/y8nkynsx>), have partial biological treatment; however, St.

Martin, a community of 343 people in central Minnesota, stands out with an entirely engineered biological plant.

Beyond the innovation in the plant is the strong community involvement in the project. Minnesota Department of Health (MDH) engineer Kim Larsen credits city

clerk Cara Olmscheid, St. Martin's only full-time employee, for her commitment to the project. Olmscheid, who notes that "city clerks have to wear many hats," is knowledgeable about and involved in the water system in addition to the other duties she carries out each day.

Olmscheid recognizes the support of James "Boots" Rothstein, a colorful native of St. Martin who has been mayor since 2002. Rothstein spent 35 years in New York, working for Chase Manhattan Bank, operating a restaurant, and serving 12 years as a detective for the New York Police Department, working undercover to infiltrate prostitution and pedophilia rings. Rothstein returned to his hometown



Dave Schaaf of the Minnesota Department of Health, Dave Schultz of WSB & Associates, and Boots Rothstein, Mayor of St. Martin.





to assist his aging parents and has also been active in combating human trafficking in the area.

Rothstein was president of the Sauk River Watershed District and, as mayor, the primary proponent in initiating the water project, according to Olmscheid. "As others sat back and talked about the cost, the mayor said, 'We have to have good water.'"

SOURCES

The city had been operating with two shallow wells (1 and 2), which had benzene levels above the maximum contaminant level (MCL). The Minnesota Pollution Control Agency (MPCA) installed filters at the wells that dropped the benzene to below detectable levels.

Olmscheid said in 2006 they discovered a hole in the casing of Well 1, prompting its sealing and the drilling of a new well (Well 3) next to it. The wells were near a creek and considered vulnerable to contamination. In 2011, the city found a hole in the casing of Well 2, and took it out of service, leaving St. Martin with only one well.

Meanwhile, Rich Soule of the MDH Source Water Protection Unit came to St. Martin and expressed concern about the location of Wells 2 and 3, especially since the creek that was the outfall of the wastewater treatment plant, which had a history of petroleum release. Because of the MPCA filters, Soule said, "There was no screaming need to get something done, but there was a concern, especially with two wells in the same aquifer," adding, "Don't put your eggs in one basket."

The geology of the area is underlain with a granite shelf, making it difficult to find sites with a sufficient yield within the city limits, so St. Martin drilled two new wells to the east of the city.

Larsen said the current wells are considered non-vulnerable, in contrast to the shallow wells by the creek. However, high levels of iron and manganese in the ground caused aesthetic concerns, especially with the staining of fixtures in people's homes. "It was awful," said Olmscheid. In addition, high levels of ammonia are present in the new wells, although not as high as they had been in the previous ones.



The biological iron filter, the first of the chain of three filters.

During this period, St. Martin was meeting with the U. S. Department of Agriculture (USDA) Rural Development regarding its wastewater and found

out that rates that they qualified for, based on per-capita income, could be carried over to a water system.

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St. Martin explored its options, worked with MDH, USDA, Tonka Water of Plymouth, Minnesota, and WSB & Associates, Inc. of St. Cloud, and settled on biological treatment, using naturally occurring bacteria instead of chemicals to remove contaminants. The city leased a trailer to do a pilot study, which was set up by Tonka Water and WSB & Associates, and city staff did the daily testing and pilot work. Olmscheid said they performed the studies for four months, wanting to make sure the innovative technology would work.

TREATMENT PROCESS

The plant has three vessels. The first is a biological iron filter, which receives the water after air has been added to facilitate the biological oxidation of iron.

More air is then injected to facilitate the biological conversion of ammonia to nitrite and then to nitrate. "We're not feeding any organisms," said Dave Schultz of WSB & Associates, "just creating a robust environment for the natural bugs to grow biologically and convert the ammonia, letting nature do the work."

The second vessel is an ammonia nitrification filter, in which two reactions occur. The first, the oxidation of ammonia

to nitrite, is by the nitrosomonas genus bacteria. The next is by the nitrobacter genus to convert the nitrite to nitrate.

Oxidized manganese and any remaining biological matter are filtered with anthracite and greensand in the third vessel.

After filtration, three chemicals are added: fluoride for dental care, chlorine for disinfection and to maintain a residual in the distribution system, and a corrosion-control inhibitor.

The filters are backwashed with non-chlorinated water from a concrete backwash holding tank in order to not disrupt the bio-growth on the filter media.

Construction began in July 2016, and the total project cost just more than \$3 million, which included the plant and related infrastructure. Approximately 45 percent of the amount came from a grant and the rest from a 40-year loan at an interest rate of 1.875 percent, both from USDA Rural Development.

ASSET MANAGEMENT

St. Martin has been forward-looking in other ways, according to Larsen, who pointed out that most small cities with only one full-time clerk and a few operators do not have the time and resources to develop an asset management plan. "St. Martin has spent

many years focused on the future of the water system." Utilities, typically larger ones, use asset management to maintain their infrastructure in a controlled and planned manner, to set water rates in a way to offset the need for loans, and to keep operating without disruption.

A detailed list of assets – wells, valves, meters, storage facilities, pipes, and service lines – helps cities develop a plan on how to maintain and/or replace them and to head off emergency situations that may disrupt service and cause unexpected expenses. "St. Martin has good information because the city clerk [Olmscheid] has an excellent understanding of the importance of infrastructure. She enjoys solving problems, getting funding, and seeking to better the town. And [she's] not afraid to spend money. The person or persons in charge of the checkbook are critical drivers in having a CIP [capital improvement plan] or asset plan."

The new treatment plant went on-line in September 2017. Larsen credits Olmscheid and other city leaders for their commitment to the water system.

"We were keying on this because of the community involvement," said Larsen. "Everyone was so excited about it. That's terrific." •



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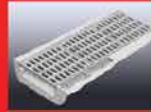
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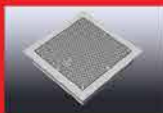
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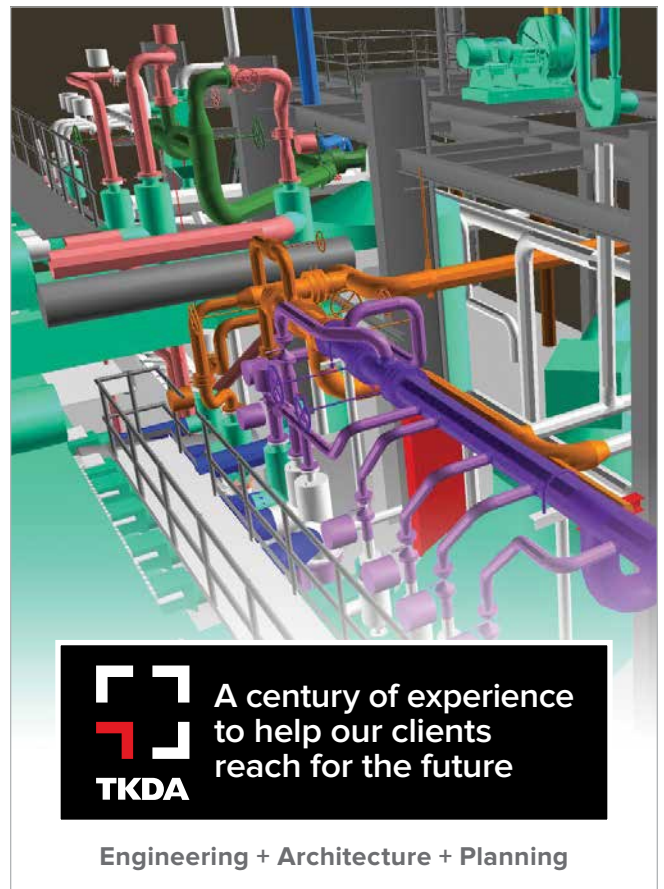
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Jordan Valley Water

Redefines

Sustainable Water Supply Through Energy Management

Written by Robert B. Sowby, Steven C. Jones,
Alan E. Packard, and Todd R. Schultz



A major Utah water district reduced its energy footprint by 19 percent after following a two-year energy management program, implementing both technical and organizational change in pursuit of its vision to provide a more sustainable water supply.

Serving the greater Salt Lake City area, Jordan Valley Water Conservancy District (JVWCD) is one of Utah's largest public water suppliers. Primarily a wholesaler of water to cities and improvement districts, JVWCD serves a population of approximately 680,000. About 75 percent of its water comes from surface water sources in the Provo River watershed or

from local streams of the Wasatch Mountains' east bench. The remaining 25 percent comes from groundwater deep beneath the Salt Lake Valley. Sourcing, treating, and delivering high-quality water requires significant energy, which is one of the district's largest operating costs, averaging \$4 million per year. To improve its sustainability through efficiency, JVWCD realized it needed to optimize its energy use.

MOTIVATION

A water utility's energy footprint plays a role in its financial, environmental, and social impacts. With increasing population,

stricter water quality standards, and rising energy costs, energy efficiency in the water sector is emerging as a primary contributor to its overall sustainability. In recent years, many new resources and best practices have been developed to promote energy efficiency in the water sector (Sowby & Burian 2017, AWWA 2016, Chelius & McDonald 2016, Jones & Sowby 2014, Martin & Ries 2014, UDDW 2014, Liu et al. 2012, NYSEDA 2010, Moran & Barron 2009, USEPA 2008, Barry 2007).

JVWCD's vision is "to provide a sustainable water supply to promote individual and community wellbeing." However, although energy use was being monitored and considered with operational adjustments, only in recent years has energy management been directly viewed through the lens of sustainability. For water and wastewater utilities, energy management contributes to sustainability's triple bottom line by controlling costs, reducing emissions, and increasing public confidence while providing a vital service.

Engineering consultant Hansen, Allen & Luce had previously worked with JVWCD and its electricity provider, Rocky Mountain Power (RMP), and understood the potential for energy savings in JVWCD's system. Convinced that the optimization effort would pay back quickly through the energy savings, RMP decided to sponsor a strategic energy management (SEM) program for JVWCD, with Hansen, Allen & Luce and another consultant, Cascade Energy, as delivery partners. JVWCD staff was also an important part of the SEM team, which began its optimization efforts in late 2014.

The program contained the following components:

- Energy management workshops to build awareness, engage JVWCD staff, and develop an in-house energy optimization team.
- Energy model development, energy performance tracking, and savings verification.
- Engineering analysis to identify and help implement energy saving opportunities, financial incentives for operational changes, and capital projects leading to energy savings.

It was a new experience for all parties. The power company had never engaged a water utility in this type of program before, and

“Knowing that long-term energy savings would require more than just technical solutions, the program included a series of focused workshops.”

JVWCD was just starting to consider ways to further reduce its energy impacts. JVWCD and its consultants had promising ideas but had not attempted this level of engagement. Wanting to under-promise and over-deliver, the team set a modest goal to save 1 million kilowatt hours (kW·h) in one year, or about 2 percent of JVWCD's usual energy use. At the end of one year, the team would evaluate its performance and determine whether the savings would justify additional focused optimization efforts.

METHODS AND TOOLS

System-wide perspective. While the most touted energy efficiency practices for water systems are limited to equipment and facilities, the team stepped back for a more holistic perspective.

Instead of asking, “How can we make this pump or building more energy efficient?” the team asked the deeper question, “How can we provide an energy-efficient water supply?” Looking beyond equipment and facilities to JVWCD's entire system and even to its neighboring water utilities, this outside-the-box thinking enabled the team to identify larger, system-level opportunities that otherwise would have been overlooked. JVWCD examined the purpose and performance of each link in its water supply chain to find a better path for water delivery.

Workshops. Knowing that long-term energy savings would require more than just technical solutions, the program included a series of focused workshops. These workshops provided basic energy management training, helped guide JVWCD's newly formed energy optimization team, and disseminated energy efficiency approaches to all parts of the organization. Numerous efficiency ideas emerged from the workshops.

Energy model. To determine JVWCD's typical energy use, a two-year baseline period (December 2012–November 2014) was defined. Monthly energy use and water production data from this period informed an energy model that related the amount of energy used to the water volume produced by each of JVWCD's water sources. This also eliminated any effects of water demand on the total energy use. Since JVWCD has many facilities and electric meters and had never before linked water and energy data in this way, the energy model was the most difficult part of the process. Once the energy model was complete and the performance period had begun, water and energy data were entered each month – energy savings (or increases) were determined by comparing the actual and predicted energy use.

Energy map. The team quantified the energy requirements of each water source in what is called an energy map. All other considerations being equal (water rights, water quality, capacity, etc.), an energy map helps prioritize the most efficient use of water sources. It specifies the order in which water sources should be dispatched to minimize the energy required to meet water demands. The energy intensity of each well, booster pump

“While the most touted energy efficiency practices for water systems are limited to equipment and facilities, the team stepped back for a more holistic perspective.”

station, and treatment plant, in kilowatt hours per acre-foot, was computed from historical records and the energy model. Since energy intensity has little meaning for most people, JVVCD expressed the values as costs in dollars per acre-foot based on the average electricity price. The assignment of a dollar amount to the operation of each facility made the energy impacts more apparent. The energy map also considered exchanges and agreements with other water users outside of JVVCD's system.

Hydraulic model. An extended period hydraulic model (a computer simulation) of JVVCD's system helped the team identify inefficiencies and test alternatives. The hydraulic model offered insight that augmented the operators' immense knowledge, providing a means to visualize how water could be more efficiently distributed. When an operational change or capital project was proposed, its effects on water quality and pressure were evaluated in the hydraulic model.

TECHNICAL CHANGES

The aforementioned methods and tools helped the energy optimization team compile a list of 88 energy-saving ideas

across the system. When ideas were prioritized, several actionable recommendations, based on system data, emerged.

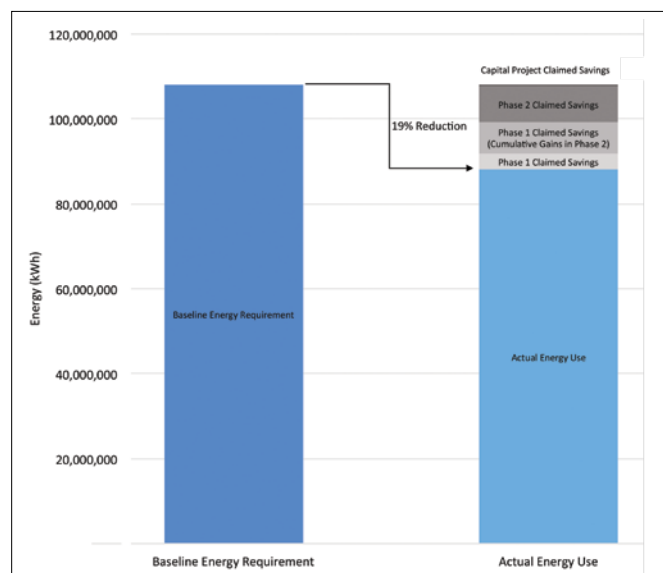
Source prioritization. As expected, JVVCD's two gravity-fed surface water treatment plants had the lowest energy intensities, costing \$4 to \$16/acre foot, while groundwater resources that relied on pumping cost much more at \$50 to \$209/acre foot. (Figure 1; the gravity-fed plants are indicated by the light-blue bars.) The district had always recognized that its surface water treatment plants were less energy intensive, but expressing the data in these terms helped the team fully grasp the magnitude of potential energy savings.

Using this perspective, the operational staff understood the financial consequences of their decisions and implemented adjustments to operating protocols accordingly. While preparing the energy map, the team realized that JVVCD had surface water rights in Echo Reservoir that were underused. Located in the mountains, Echo Reservoir was a gravity-fed supply that only required treatment and could offset much of the district's energy-intensive groundwater pumping.

Surface Water



Figure 1 - Savings Chart





“Accordingly, the district chose to promote its best performing wells and demote worse performing ones, proceeding down the list as water demands increased through the summer and taking less efficient wells offline when demands waned.”

Historically, JWCD had tried to save this water right for supplemental use in the summer months. This strategy worked, but there were limitations in conveying the Echo Reservoir water in the summer, so the district frequently would not receive its full allocation of this source. The energy optimization team found that if JWCD used this source earlier in the year, there was a greater probability of maximizing the full yield of the water right. JWCD also found that its “favorite” wells were not necessarily the most energy efficient. Until the team examined the data, they had assumed that the newest or most conveniently located wells were the most efficient. In reality, one well could cost four times as much as another to produce the same amount of water. Two wells in particular had unusually high-energy intensities. Accordingly, the district chose to promote its best performing wells and demote worse performing ones, proceeding down the list as water demands increased through the summer and taking less efficient wells offline when demands waned. JWCD applied the same concepts to the booster stations that move water between zones. Irrigation exchange. Delivery of raw water for irrigation is an important component of JWCD’s energy profile.

In the past, JWCD primarily pumped water from the Jordan River into a canal system. Also nearby was the Provo River Aqueduct, a gravity-fed raw water source. JWCD has used both sources for many years, but it recently gave specific attention to maximizing the aqueduct source when available. As with Echo Reservoir, this was an opportunity to favor a higher-head water source and avoid pumping.

A new valve was installed to more precisely control the flows when bypassing the pump station to convey aqueduct water to the canal system by gravity. Using the hydraulic model, the team identified several locations where pressure-reducing valves and their settings created undesirable operating conditions. JWCD personnel adjusted these settings to eliminate over-pressurizing and pumping in circles.

Source proximity. JWCD’s water system covers almost the entire Salt Lake Valley, prompting strategies to reduce the overall pumping distance and energy requirements by using the water sources closest to the demand. Combining the energy map and the hydraulic model, the team identified the best options for local water deliveries.

Transmission capacity. The hydraulic model revealed several bottlenecks where transmission capacity was insufficient and caused large pressure fluctuations. The team then explored both capital and operational solutions.

Member agency coordination. JWCD supplies water wholesale to 17 member agencies throughout the Salt Lake Valley at multiple delivery points. Some of the transmission bottlenecks were associated with these connections. Hydraulic modeling helped determine a more efficient delivery scheme using off-peak capacity, excess capacity, storage, and wheeling in certain areas of the system. JWCD then coordinated with its member agencies to optimize their deliveries. Shifting the water demand in this manner effectively eliminated a number of bottlenecks and the pumping that was otherwise required to overcome them.

Capital projects. Although the program focused on operational changes, a few capital projects were identified and completed. JWCD completed upgrades to its 10200 South Pump Station, which included replacing two pumps and motors and modifying the 36 in. discharge pipeline. The upgrades increased the energy efficiency of the station, which several wholesale customers rely on. Midvale City, one of JWCD’s wholesale customers, needed to construct a new meter station to accommodate significant new water deliveries from JWCD. The original plan involved a single meter station, but by modeling both Midvale City’s and JWCD’s systems, the team found that constructing a second meter station feeding a lower pressure zone would result in significant savings. This project is currently in progress. The 2-million gallon Naniloa Reservoir was removed from service over 20 years ago because of operational restrictions that limited its usefulness. However, using hydraulic modeling, the team determined that making a few adjustments and placing the reservoir back in service would reduce energy consumption and control the pressure fluctuations that occur in that segment of JWCD’s system. The design for this project is currently underway.

Building efficiencies. The team explored several smaller efficiency opportunities in JWCD’s buildings. The ideas included reevaluating thermostat controls, installing efficient lighting and automatic timers, and having employees shut off personal computers and lights when they leave the energy

savings goal. Modeled after the district's successful safety program, the energy optimization team worked to shift the organizational culture toward efficient energy use.

Multidisciplinary team. The district's energy achievements have been a cooperative effort led by a multidisciplinary team that is strategically staffed with key employees representing all departments within the district. The energy optimization team structure matches the organizational hierarchy of the district and starts at the very top with the district's general manager. Program buy-in from upper management is essential for the success of any program that involves employee resources, operational performance, and output of a water utility. Of the district's nearly 150 employees, roughly 10 percent have a role on the energy optimization team. After considering upper management buy-in, the district's energy optimization team was broken down into four distinct groups: project leads, management team, action team, and support team.

Each group plays an integral part of the overall program:

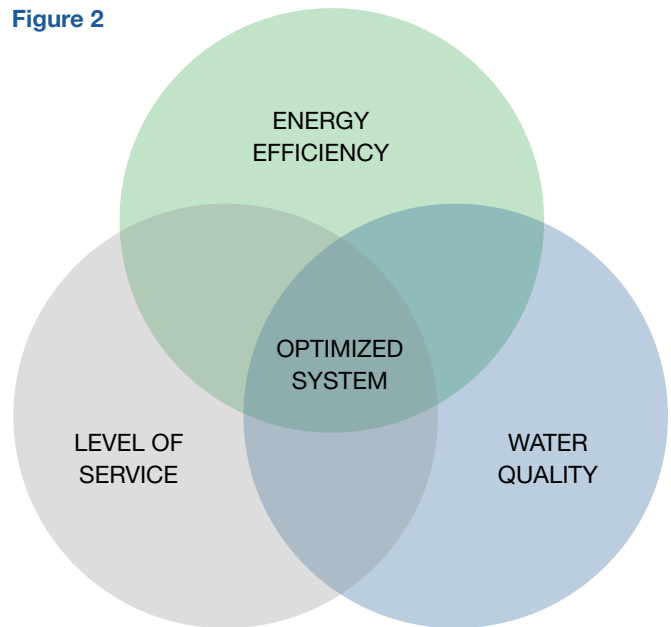
- The project leads consist of an executive sponsor, who is one of the district's assistant general managers, and an energy champion, who is the district's senior data analyst. The senior data analyst was chosen as a project lead because of the data demands of the program.
- The management team is primarily staffed by department managers, each representing core functional areas of the district. The role of this team is to allocate appropriate staff time and resources to enable successful program performance.
- The action team is staffed with key employees from each department. The members of this group meet to discuss new ideas, share strategies, and generate involvement from their respective departments.
- The support team helps with administrative and technology needs.

Culture. The district has emphasized adapting the culture of the organization to help employees better understand how their roles affect energy use. This has provided substantial energy savings through the optimization of operations, maintenance, and capital projects.

Historically, JWWCD's operational group had done an excellent job monitoring and managing power demand. This group also monitored the efficiencies of each particular facility, but spent less effort evaluating energy use holistically. The

“A water utility’s energy footprint plays a role in its financial, environmental, and social impacts.”

Figure 2



energy optimization team found that the broader view showed a handful of low- or no-cost actions that could reduce energy use, but the team realized there could be several barriers to implementation. One of these barriers is employee tenure. The district's median tenure is 11 years, which is high compared with the national average of 8.3 years for similar industry (BLS 2016). This was an important consideration because employees who have been doing the same job for several years tend to resist change when exploring ways to improve familiar tasks.

To create program synergy, the district considered motivators for all employees and found that data analytics, employee involvement, and quick wins all contributed to the buy-in and success of the program. Data analyses provided support to change recommendations and gave actual evidence that energy could be saved. Involving employees in finding and recommending solutions and listening to employee concerns helped gain trust in the program and instill ownership. Quick wins helped the velocity of the program; when employees started seeing positive results from their actions, they gained interest, and program contributions increased.

The district will never sacrifice level of service or water quality to save energy, but it has found that there is often a more efficient way to deliver the total package (Figure 2). In fact, energy efficiency often helps improve level of service and water quality, which results in an optimized system (Jones & Sowby 2014).

Tracking. The district reports various key performance indicators to its board of trustees every month in a scorecard based on the “Ten Attributes of an Effectively Managed Utility” (U. S. Environmental Protection Agency et al. 2017).



“The avoided carbon dioxide emissions equated to 21,000 tons from a coal-fired power plant or 4,000 typical passenger vehicles for one year.”

For energy, the key performance indicator is energy use per volume of water delivered, much like the energy map described earlier, but for the system as a whole. The scorecard compares the district's energy use with the baseline model and is green if actual use is less than the baseline value, yellow if actual use is between 100 percent and 105 percent of the baseline value, and red if actual use is greater than 105 percent of the baseline value. The district also has other reporting tools that are used for data-driven decision-making and operational planning purposes.

Planning and operating protocol. Typically, the energy optimization action team meets every other month to discuss program matters, but the operational group – the group that uses the majority of energy – discusses energy considerations every week or whenever there is a need to start a motor.

RESULTS AND DISCUSSION

In the first eight months of the program (December 2014–July 2015), JWWCD saved 3.9 million

kW·h, nearly quadrupling the original goal of 1 million kW·h, with four months to spare. There was no longer any question about whether the effort was worthwhile. With such momentum, the program immediately continued into a previously unplanned second phase (another 15 months: August 2015–October 2016), which logged another 8.6 million kW·h beyond the continued savings attributed to phase 1.

By the end of phase 2, JWWCD had cumulatively saved over 20 million kW·h, or 19% of its baseline energy use predicted for the same period. In the end, most of these savings came from operational adjustments rather than capital projects. The avoided carbon dioxide emissions equated to 21,000 tons from a coal-fired power plant or 4,000 typical passenger vehicles for one year. RMP offered numerous incentives for energy management and capital projects, and even reimbursed the salary costs of the district's energy project manager. At the end of phase 1, JWWCD received over \$284,000 in RMP incentives. At the end of phase 2, RMP officials presented JWWCD with a check for the phase 2 incentive of \$172,878, the largest strategic energy management incentive RMP has ever offered. RMP estimates that the program saves JWWCD more than \$492,000 in electric costs per year.

In May 2016, JWWCD earned the top award in the Utah Industrial Energy Efficiency Challenge for the results of its efforts. In July 2017, JWWCD was named a Rocky Mountain Power wattsmart Business Partner of the Year. Phase 3 of JWWCD's already successful energy management program is underway. The team continues to pursue actions not completed in the first two phases and to generate additional ideas as new insights arise.

CONCLUSION

JWWCD now realizes that efforts to use electricity as efficiently as possible are consistent with its other programs to conserve water resources and strengthen its ability to provide high-quality water services. JWWCD joins the growing number of water utilities embracing energy management as a best practice (MassDEP 2017, Sowby 2016, Jones et al. 2015, Mundt & Dodenhoff 2015, Horne et al. 2014, USEPA 2013). Since pursuing its energy management program, the district has found new meaning in its vision “to provide a sustainable water supply.”

ACKNOWLEDGMENT

The authors thank Raenee Bugarske and Clay Monroe at Rocky Mountain Power; Jeff Hare at Cascade Energy; colleagues at Hansen, Allen & Luce; and members of JWWCD's energy optimization team for supporting JWWCD's successful energy management program and this article. •

“The district has emphasized adapting the culture of the organization to help employees better understand how their roles affect energy use. This has provided substantial energy savings through the optimization of operations, maintenance, and capital projects.”

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Small But Mighty

The story of one determined teacher who has changed the future of water for an entire community.

Neatly cultivated fields cover the steep slopes of the Andes, lining the countless hairpin turns on a narrow road that bring you to the quiet mountain town of Asunción in Peru. Nestled at over 7,000 feet of elevation, the town's 1,600 residents are

accustomed to the slow pace of farming life in their corner of the mountains.

Step inside the town's secondary school, though, and you feel the energy. Students in navy uniforms rush across the courtyard and along the plant-lined corridors on their way to their first classes of

the day. In the science and environmental classroom, posters about water and taking care of the environment cover the walls, and students are proudly sharing about these topics. *Agua es vida*, the students say whenever they talk about water. Water is life.

Science and environmental teacher



Maritza Rodríguez Atalaya has been a teacher here for 15 years.

"I love my career," she says. "Being a teacher is my passion."

Petite and sprightly, Maritza's teenage students tower over her. But don't be deceived by her small stature. Although she may humbly say otherwise, Maritza is the powerhouse behind getting water to the school.

When she first started teaching at the school, Maritza says her students would ask her to go get water. "I was surprised – I'd never had students ask me this," she said. One day she followed them, and realized they were going to a nearby spring, but the water they were drinking was contaminated and led to diarrhea and other illnesses that would often keep students home from school.

Determined to change this for her students, she instituted a new classroom policy: the students would take turns bringing home a large plastic jug. They'd boil water at home and bring the jug back, full of water that was safe for their classmates to drink.

But this could only be a temporary solution. Students who lived far away had trouble carrying the heavy jug, and

Maritza was also still concerned about the untreated water from the nearby spring. Although the water wasn't safe for drinking, it was going to waste.

"No one was using the spring," she said. "It would overflow and be wasted and go onto the streets."

Despite resistance from the school leadership, Maritza was determined to create change.

"I started anew, working and working," Maritza says. "But there was no support – not from the other teachers or the principal. The project was only mine."

Maritza forged ahead however she could, teaching the students who cycled through her classroom about the importance of safe water and hygiene and taking care of the environment. For years, she did this, all on her own.

And then in 2015, the school got a new principal.

"I told him about the project and he really liked it," Maritza said. "He said, 'You have all of my support, you have to do this.'"

In the past two years, the school has made huge strides. They connected the nearby spring to the school, and now that previously contaminated and wasted water is now treated and safe for

students to drink. Each student brings a water bottle to school each day – constantly refilling it with drinking water and reducing environmental waste. The education Maritza started in her own classroom on water, hygiene, and the environment has spread through the entire school, infiltrating every class and empowering students to change norms in their own families and communities.

One day, Maritza says she was on a bus to a neighboring city and saw someone throw a glass bottle out of the bus window. Two girls on the bus were so upset they approached the man who threw the bottle to tell him why he shouldn't do that.

"I looked and it was two former students from the school," Maritza said. "That is something that as a teacher made me satisfied. I'm really happy with how things are improving."

Maritza's years of perseverance have paid off, and the entire culture at the school around water and sanitation has changed. Her students are sharing what they've learned with their families and throughout their communities – and all of Asunción is feeling the impact. •



A young green plant with three leaves is growing out of a stack of newspapers. The background is a blurred stack of newspapers, with the word 'USE' visible on one of the pages.

USE PAPER RESPONSIBLY

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- ♻️ What other industry generates most of its own energy needs from renewable resources, including waste biomass, biogas, hydro and wind?
- ♻️ What other industry uses a renewable resource and recycled stock as its main ingredients?
- ♻️ What other industry has worked harder on improving its environmental performance with partners and advocates including governments, customers and environmental groups?

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Worldwide spam email traffic creates greenhouse gases equivalent to burning two billion gallons of gasoline yearly, with numbers rising. More than 200 million items of toxic e-waste are thrown away every year in the US alone, with a recycling rate of only 18% compared to 57% for paper. Estimates are that North Americans throw out more than 500,000 toxic computers and cell phones every day.

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If you are interested in being published in a future issue of *Breeze* magazine and contributing significantly to the advancement of our profession, please contact:

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People



Bassam Banat has retired after 32 years and 4 months with the Minnesota Department of Health. Born in Beirut, he began playing soccer professionally when

he was 17 years of age and made it to the highest level on the Lebanon Premier Team. He also played two years in the United Arab Emirates. Banat came to the United States on December 22, 1975 at the age of 23. He eventually made his way to Grand Forks to study civil engineering at the University of North Dakota, where he was the captain of a club soccer team. After college he worked as a civil engineer in Abu Dhabi in the United Arab Emirates from 1981 to 1985. Banat, married to Becky by this time, returned to the U. S. and applied for jobs. He was hired by Gary Englund to begin work at the Minnesota Department of Health on September 9, 1985.

Todd Johnson and **Kim Larsen** have been named district engineers supervisors for the Minnesota Department of Health, succeeding

long-time engineers/supervisors Dave Schultz and Mark Sweers, who retired in 2017. Johnson will be responsible for contaminants of emerging concern, special sampling (such as the Unregulated Contaminant Monitoring Rule), and the training and quality related to sanitary surveys and monitoring. Larsen, the engineer for the Central-South District, maintains other responsibilities, including emergency preparedness and response (working with security engineer Jon Groethe), Legionella management and response, and cross-connection control.



Ruth Hubbard is retiring after nearly 35 years with the Minnesota Rural Water Association (MRWA), the last 22 as the administrator/executive director. A

native of Elbow Lake, where the MRWA office is located, she began in 1983 at the time the office was moved from Slayton to Elbow Lake. Hubbard will preside over her final MRWA technical conference in March before retiring.



Succeeding Hubbard is **Lori Blair**, who has worked at MRWA for 18 years, most recently as an information specialist.

A native of Iowa,

Blair got her Bachelor of Science degree in business administration from Southwest Minnesota State University in Marshall. Blair's husband, Brian, works for the Minnesota Department of Transportation. Lori and Brian have two daughters, Alyssa and Ashton, who are in college, as well as a dog, Duke, and a cat, Lucky.

Terry Schiro has retired from Vessco Inc. in Minneapolis after more than 30 years in the chemical-feed industry. Jeremy Bakke will be taking over Schiro's territory. Bakke as worked in the water and wastewater industry as an operator, service technician, and salesman.

Scott M. Anderson is the new utilities superintendent for the city of Bloomington. He is a professional engineer and has worked for the city for many years. •





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AWWA whiteboard animation urges action on Farm Bill to protect drinking water sources

January 23, 2018

(DENVER) – A whiteboard animation produced by the American Water Works Association illustrates how Farm Bill conservation programs along with partnerships between the United States Department of Agriculture (USDA), water utilities, and farmers can be key to protecting drinking water sources.

Available on AWWA's YouTube channel and viewed more than 2,100 times, the video points out how Congress can address nutrient runoff issues through the upcoming Farm Bill reauthorization.

"Partnerships between water utilities and the agricultural community are critical in protecting our environment and drinking water sources," said Tracy Mehan, AWWA executive director of government affairs. "Now is an opportune time to advance those partnerships through the farm bill."

Using simple drawings, the six-minute video shows how nutrient runoff can lead to harmful algal blooms, such as the one that

shut down the drinking water supply of Toledo, Ohio, in 2014 for three days.

"When it rains, chemicals, fertilizers, sediment, and animal waste can be washed into streams and those streams feed into rivers, and those rivers feed into lakes," the video's narrator states. "Eventually, they can find their way into drinking water supplies for small communities, towns and even big cities."

Through the farm bill, USDA has historically provided funding to farmers and ranchers to implement conservation practices on their land. AWWA is asking Congress to include language in the reauthorized bill that specifically emphasizes drinking water protection and encourages farmer-utility collaboration.

Specifically, AWWA is advocating that the reauthorized farm bill:

- Provide robust overall funding for the conservation title.

- Emphasize protection of drinking water sources throughout the conservation title.
- Expand opportunities for the Natural Resources Conservation Service to work with water systems to prioritize activities in each state.
- Increase benefits for farmers who employ practices that benefit downstream water quality.
- Ensure at least 10 percent of conservation program funds is focused on the protection of drinking water.

The video highlights the successful partnerships that have been forged between utilities in Arkansas and Cedar Rapids, Iowa, and local farmers by using USDA programs to protect drinking water sources.

The Farm Bill and source water protection will be key issues when AWWA members from throughout the United States meet with members of Congress April 18-19 during the 2018 AWWA *Water Matters! Fly-In*. •



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1. Some months have 31 days; how many have 28?
2. In baseball, how many outs are in an inning?
3. Can a man in California legally marry his widow's sister?
4. Divide 30 by $1/2$ and add 10. What is the answer?
5. If there are 3 apples and you take away 2, how many do you have?
6. A farmer has 17 sheep standing in a field and all but 9 drop down and die, how many sheep are still standing?
7. How many two-cent stamps are there in a dozen?
8. Haywood's mother had three children. The first child was named April. The second child was named May. What was the third child's name?

Answers:

1. 12 2. 6 3. No (There is no precedent for a dead man to marry)
4. 70 5. 2 6. 9 7. 12 8. Haywood

Minnesota Made

Gene Rebeck in *Minnpost* listed 50 Minnesota innovations that changed the world. Among them are the following:

- Grocery bags with handles - 1912
- Water Skis - 1922
- Milky Way candy bar - 1923
- Mass Spectrometer for Uranium-235 - 1940
- General Mills Packaged Cake Mix - 1947
- Twister - 1964
- Nerf Ball - 1969
- Microwave Popcorn - 1984
- Minute Clinic - 2000

What does this mean?

The temperature of the aqueous content of an unremittingly ogled saucepan does not reach 212 Fahrenheit. Answer: A watched pot never boils.

Words to live by

“No one wants advice – only corroboration”

—John Steinbeck

“I’d give my right arm to be ambidextrous.”

—Former Pitcher Dick Pole

“Never miss a good chance to shut up.”

—Robert Benchley

“When your work speaks for itself, don’t interrupt.”

—Henry J. Kaiser



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