THE SOURCE

The Source is a quarterly publication of Beaver Water District Summer 2017

New Surge Tank Installed

From left, Cathy Foraker, Board member (Washington County); Stacy Cheevers, Plant Manager; Chris Weiser, Board Vice President (Washington County); David Short, Board Member (Benton County); Bill HagenBurger, Plant Engineer; Woody Bassett, Board Secretary-Treasurer (Washington County); and Bill Watkins, Board President (Benton County).

On May 18, following the monthly meeting of the Beaver Water District's Board of Directors, Board members and staff toured the new surge tank that had been installed in the District's Treated Water Pump Station. The surge tank will provide additional protection for both the District's pumps and piping that pump water to Fayetteville as well as the Fayetteville transmission mains from BWD into the Fayetteville water system. The Fayetteville system had been protected against pressure surges by a surge tower located along the transmission mains for many years. As water demands increased for the City of Fayetteville over the years, it was determined that additional surge protection was needed for the Fayetteville pumps and pipelines.

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Surge Tank being lowered into Treated Water Pump Station.

McGoodwin Williams and Yates (MWY) provided engineering and design services. Crossland Heavy Contractors provided construction services. The project, begun in February 2017 and completed in April 2017, cost $357,843. The surge tank went online April 7. Going into the summer, and with the surge tank online, the District's water flow to Fayetteville is no longer limited to 30.2 million gallons a day (MGD), which is the maximum flow value the surge analysis estimated without the surge tank online. With the surge tank online, the maximum allowable flow is increased to 41 mgd, which is the firm capacity of the Fayetteville pumps.

This is all good news for Beaver Water District and for the City of Fayetteville. The District's Master plan estimates that this capacity will be able to meet projected daily demands till the year 2032. This added capacity will also help the District better meet high diurnal (i.e. daily) demands should 2017 turn out to be a hot and dry summer.

Beaver Water District's mission is to serve our customers' needs by providing high quality drinking water that meets or exceeds all regulatory requirements and is economically priced consistent with our quality standards. BWD supplies clean, safe drinking water, sourced from Beaver Lake, at the wholesale price of $1.31 per thousand gallons to Fayetteville, Springdale, Rogers, and Bentonville. These cities in Northwest Arkansas then pump, store, distribute and resell the water to their customers — more than 320,000 people and industries in their cities and surrounding areas. For more information, visit http://www.bwdh2o.org/service-area.

Surge Tank installed and operational.

Heavy rains challenge BWD

Beaver Lake water flowing at the Beaver Water District intake.

Between April 26 and April 30, 10 to 12 inches of rain fell in Northwest Arkansas. Beaver Lake filled to capacity and the U.S. Army Corps of Engineers-Beaver Lake, opened flood gates. In the meantime, runoff entering the tributaries to Beaver Lake was making its way to Beaver Water District's intakes in the vicinity of Hickory Creek. The additional sediment led to many challenges.

For example, normally the concentration of sediment in the water, which is measured in NTUs (Nephelometric Turbidity Units) is between 2 and 10 NTUs. However, during this event, it reached levels as high as 350 NTUs.

So what does that mean to the average customers drinking water that's been cleaned and made safe for consumption for the District's four customers – Fayetteville, Springdale, Rogers and Bentonville – and their customers as they turned on the taps?

In practice, not a whole lot. That's because "we never sacrificed the quality of water that went out to our customers," said Alan D. Fortenberry P.E., the long-time Chief Executive Officer of the District. "No one noticed anything different in the water they received when they turned on their faucets, and that's the way it's supposed to be."

Fortenberry went on to explain that this is what people in the water business refer to as "a high turbidity event." This kind of heavy, ongoing rainfall can cause all kinds of disturbances to the normal routine of cleaning

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Flood debris with vegetation.

water from Beaver Lake. For instance, staff manages three drinking water plants on the campus of the District, located at 301 Primrose Road, which is approximately 2 miles from the intakes on Beaver. Extra staff came on board and others worked overtime. Staff faced electrical interruptions, plant shutdowns and restarts, and challenges with treatment that come with increased turbidity bringing in more sediment than normal. This extra sediment has to be removed, which can be a challenge. The more it rains and the more sediment washes into the lake and arrives at the intakes, the harder it becomes to make drinking water the best it can be. It costs money and it takes more staff to get the job done.

"I'm really proud of our staff," Fortenberry said. "They were eager to be of help and assistance." He added that the turbidity likely will return to normal, depending on rain patterns, by mid-June.

Clean water flowing from customers' taps.

Katie Motherwell Awarded 2017 Ted and Clara Gentry Scholarship

Each year, students from across Arkansas apply for and receive a Ted and Clara Gentry Scholarship Award. This year, Katie Motherwell of Fayetteville is one of the lucky recipients. Katie is the daughter of Kim and Adam Motherwell; Adam is Chief Financial Officer for Beaver Water District.

As a scholarship recipient, Katie was recognized at the 2017 Arkansas Water Works & Water Environment Association (AWW&WEA) conference, which was held April 30-May 2 in Hot Springs. The Ted and Clara Gentry Scholarship was established in 1984 by a Trust Agreement from the Estate of Theodore Marion Gentry. Ted "Doc" Gentry owned and operated Arkansas Meter, a water distribution and wastewater collection supply company located in Cabot, Ark. Donations to the scholarship are encouraged and made annually in memory of the Gentrys. A total of six scholarships, in the amount of $2,000 each, are awarded annually.

To be eligible a student must be a worthy dependent of someone employed by an Arkansas public/private waterworks or wastewater utility.

"We're just so proud of Katie," said Motherwell. "Katie has so many interests, and of course, she's going to the University of Arkansas right here in Fayetteville," he said. The University is his alma mater, and Katie has grown up being a big hog fan. Katie, who graduated from Fayetteville High School on May 18th, also has a brother, Chase, who's 10 years old. When Motherwell was asked whether he expects Chase to be an award winner of the same scholarship in the future, he said "I think Chase will apply himself in the same manner as his big sister. This scholarship is a big help to any family trying to piece together college funding, and we appreciate the Gentry's foresight and generosity in establishing such a meaningful legacy."

Burch Receives Professional Operators License; Top Ops Team Ranks 6th

Jesse Burch, Beaver Water District's Operations Supervisor, received his Professional Operators License at the American Water Works Association (AWWA) annual meeting held in Philadelphia in June. Beaver Water District supports continuing training and development of its employees. Safe, clean drinking water for our community depends on our dedicated & knowledgeable staff.

In other news, BWD's team placed 6th overall in the Top Ops Challenge, which is the "College Bowl" or "Jeopardy!" of the water industry. The team members are Dustin Mayhew of Springdale, BWD Plant Operator; Frank Blowers of Siloam Springs, BWD Maintenance Supervisor; and Nikki Holloway of Lowell, BWD Laboratory Analyst. The competition was held during AWWA's 2017 ACE convention, which drew more than 13,000 water professionals from around the world. This was BWD's third time to compete in the International Competition.

Annual Water Quality Reports Created To Inform the Public

Beaver Water District must meet national, health-based standards for drinking water in order to fulfill its primary mission, which is to produce safe, potable water. That means the District must comply with the Safe Drinking Water Act (SDWA), passed by Congress in 1974 and amended in 1986 and 1996. The SDWA's purpose is to protect public health by regulating the nation's public drinking water supply.

The SDWA authorizes the U.S. Environmental Protection Agency (USEPA) to set standards for drinking water in order to protect against naturally occurring and man-made contaminants. The standards set enforceable maximum contaminant levels and provide the framework for accepted methods to treat water to remove contaminants. In Arkansas, USEPA's requirements for the SDWA are managed and enforced by the Arkansas Department of Health.

To comply with these standards, the District frequently tests water at various phases of the treatment process and monitors water before it leaves the facility on its way to customers. At every step, safeguards ensure that all standards are met and that the District is in compliance with the SDWA.

Beaver Water District prepares an annual report each year. This report is shared with our four customer cities – Fayetteville, Springdale, Rogers and Bentonville. These cities use the data to create Consumer Confidence Reports (CCRs) that are required by law to be shared with drinking water customers.

Here are some definitions to keep in mind when reviewing the 2016 detailed report.

- pH is the measurement of how acidic or basic the water is. The pH scale is from 0 to 14. A pH of less than 7.0 means the water is acidic while a pH of greater than 7.0 is basic. A pH of 7.0 is considered neutral.
- Hardness and Alkalinity

Hardness in water is caused by the presence of calcium and magnesium ions. (An ion is an atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons according to Merriam-Webster.) Hard water can cause an increase in soap and detergent usage and increase mineral deposits (scaling) in hot water tanks and plumbing systems. The light colored ring that forms in a pan after boiling water is a result of the hardness of the water. Soft water doesn't require as much soap to work up a lather; however, if the water is too soft you will have trouble rinsing the soap off and may be left with a slimy feeling. The 2016 average hardness of the water distributed by Beaver Water District was 61 parts per million (ppm) which is moderately hard.

Alkalinity is the quantitative capacity of water to neutralize an acid; that is, the measure of how much acid can be added to a liquid without causing a significant pH change. Automatic dishwasher detergents, most cleansers and hard surface cleaners utilize alkalinity for their cleaning ability. Hardness and alkalinity are often talked about together because many chemical substances contribute to both hardness and alkalinity.

Link to the complete 2016 Annual Water Quality Report on the District's website: http://www.bwdh2o.org/wp-content/uploads/2017/03/2016-Water-Quality-Report-Final.pdf

Quality of Water in Beaver Lake: A Brief Overview

By Ray Avery, Environmental Engineer, Beaver Water District

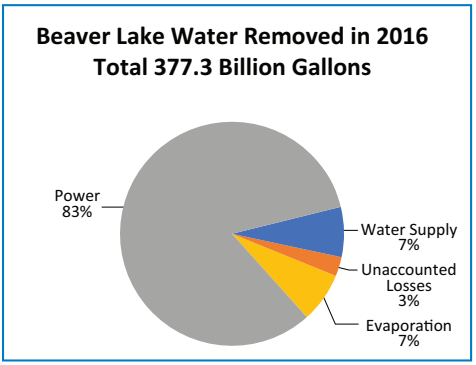
Hot and dry. That sums up the past year in Northwest Arkansas. Did you know that 2016 ranks as the sixth warmest year on record in Northwest Arkansas since 1895, with an average temperature of 59.2º F?

Rainfall was over 8 inches below the 20th century average. Portions of Beaver Lake's watershed were abnormally dry in the spring and under drought conditions in the fall and winter.

Beaver Lake started the year almost completely full of water, with the maximum volume stored occurring on Jan. 3 (1.92 million acre-feet). The minimum volume stored occurred on Dec. 31 (1.42 million acre-feet). The difference between these two volumes is equivalent to the amount of water that would fill more than 240,000 Olympic size swimming pools. To put this into perspective, an Olympic size pool holds 660,430 gallons of water. A total of 1.15 million acre-feet (377.3 billion gallons) were removed from the lake in 2016.

On April 20, the lake at Beaver Water District's intake near Lowell was thermally stratified – meaning the lake had separated into layers caused by the large difference in density between cold and warm water. By Nov. 15, the lake had mixed. (Mixing occurs usually during the fall, as decreasing air temperature and winds cool the water near the surface causing it to become denser and sink. Some people use the term "lake turnover" to describe this phenomenon.)

Overall, water quality was relatively stable during 2016 due to the lack of large rainfall events. Turbidity was high at the beginning of the year — over 200 NTU — but quickly decreased as the water warmed. It stayed below 10 NTU from April until the end of the year. (Turbidity is a measure of the cloudiness of water caused by suspended particles. It is measured in nephelometric turbidity units or NTU.)



Warm clear water is favorable for the growth of cyanobacteria that may produce metabolic compounds that are responsible for the musty taste and odor of Beaver Lake water in early autumn. These compounds include 2-Methylisoborneol (MIB) and Geosmin, which are produced as part of the cyanobacteria's normal life cycle.

MIB and Geosmin are detectable to people at different levels, but the standard threshold number is 5 parts per trillion. Some people may not notice any taste and odor until the levels are much higher. Others may never notice it. To put this in perspective, imagine pouring 2.5 gallons of MIB into Beaver Lake and mixing it up. That's all it takes to reach 5 parts per trillion in the lake. MIB and Geosmin were above the threshold detection limit of 5 parts per trillion for 109 days and 20 days respectively in 2016. Lake water quality is also highly influenced by the quality of the water coming in.

More details on the lake and inflowing water quality can be found in the complete 2016 Beaver Lake Water Quality Report that is available on Beaver Water District's website at http://www.bwd-h2o.org/wp-content/uploads/2017/03/2016-Beaver-Lake-Water-Quality-Report.pdf

Mark Aug. 19th on your calendar to attend12th Annual Secchi Day on Beaver Lake; Free Fun, Food, Kayak Test Drives, Door Prizes, Water Fun Facts Concert with Papa Rap & More

Looking for some low-cost family fun at Beaver Lake this summer? Well, look no farther! Just head out to Prairie Creek Park on Beaver Lake from 9 a.m. to 1 p.m. on Saturday, Aug. 19th! Join in the fun that's planned for the 12th anniversary of Secchi Day on Beaver Lake, a free water appreciation science festival for all ages. If you've never been there, this is the perfect time to go. It's easy to find – just plug the address 9300 N. Park Road, Rogers, AR into your GPS — and you'll travel just a few miles east of Rogers off of Highway 12 in beautiful Northwest Arkansas to arrive at this beautiful park on the lake.

Once there, you can visit the mobile aquarium, test drive a kayak, participate in the scavenger hunt and win door prizes, use a microscope, interact with live reptiles, make your own water testing device to take home, make it rain on the watershed, and see how water flows impact water quality in the lake. The emcee of events is Dan Skoff, Chief Meteorologist for KNWA/Fox 24, along with James McCarty, manager of environmental quality for Beaver Water District. They will be welcoming volunteer teams who will turn in water samples and water clarity readings that will be entered on the "Great Wall of Secchi" tote board throughout the event.

"This is the 12th year we've held this event," said Amy Wilson, Director of Public Affairs for Beaver Water District. "This year, we plan a few new activities that are still coming together (think cultural diversity along with dance and perhaps another water activity, in addition to kayak test drives). While our core group of partners and lake volunteers are collecting water samples, the general public is invited to enjoy this free event that focuses on the importance of Beaver Lake to the quality of life in Northwest Arkansas. In addition to 12 door prizes and a grand prize kayak (courtesy of Cabela's), we'll have hot dogs (traditional and vegetarian), ice cream, fruit and other snacks available. We care about Beaver Lake. We want all of our citizens to care about it, too. Getting involved and having fun is a good way to start! Remember, this lake supplies drinking water for one in seven Arkansans."

Secchi Day on Beaver Lake is named for the Secchi disk, a black and white device lowered into the water to measure clarity. In the early part of the morning, citizen science volunteers, using their own boats, collect water samples and take Secchi disk readings. They

bring their samples and clarity readings in to shore where Skoff and McCarty record them on the Great Wall with lots of fanfare, something along the lines of a weigh-in at a fishing tournament.

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