by Brad Mears, City of Holton
John Ruckman, Bartlett & West Engineers, Inc.

Public partnership proves successful

In an effective and successful public partnership, the City of Holton, KS and the Jackson County Rural Water District (RWD) No. 3 formed Public Wholesale Water Supply District (PWWSD) No. 18. The goal was to increase the water capacity to both entities. Today, the partnership provides an innovative example of a public partnership providing cost-effective, quality water treatment serving multiple public entities.

Holton and Jackson County Rural Water District No. 3 both had individual water supplies and both had experienced water shortages, including mandated water conservation measures for their residents during peak demand times. Additionally, those facilities were not able to provide additional water source necessary to meet future demand. Projections showed that by 2015 water demands would reach 1.6 million gallons per day (mgd) for both entities during peak demand periods. Current average water demands from the plant have averaged 0.56 mgd over the last 6 months. Neither entity had the financial ability to meet that demand alone.

In 1995 and 1996, Holton and RWD 3 contributed to the construction of the Banner Creek Reservoir, and then secured water rights from the reservoir, utilizing the multipurpose small lake to supply water to the municipalities. The reservoir was constructed for flood control, to enhance the water supply and provide a recreational lake for local residents with a multitude of camping, boating and fishing opportunities.

Bartlett & West Engineers, Inc., Topeka, was selected to design and construct a new water treatment plant to provide quality water to residents. "We selected Bartlett & West because we were looking for proven experience in water treatment," said Brad Mears, Holton City Manager. "Their familiarity with similar situations and their willingness to work to meet the goals of both entities made them the obvious choice."

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Early in the design process, two primary decisions had to be made. First, the project team considered filtration options – media filtration or membrane filtration (microfiltration or ultrafiltration). At the time, anticipation of future Environmental Protection Agency (EPA) regulations regarding cryptosporidium removal, membrane filtration was recommended as the best treatment process. The membrane filtration also offered a distinct economic advantage for expanding the treatment plant to meet future plant capacity of 3.0 mgd. The second decision regarded type of clarification system - Superpulsator clarifiers or ClariCone clarifiers. The differences were minimal; ultimately the ClariCone clarifiers were selected for their competitive cost and ability to manage wide swings in the raw water turbidity.

"We think the real interesting aspect of this plant, in addition to the public partnership, is that PWWSD No. 18 was one of the first plants in Kansas to utilize ultrafiltration membrane technology," said John Ruckman, Bartlett & West project manager. "The project team was very forward looking in making that decision, and ultimately we all agree that it was the right one. This plant is a win-win for everyone."

Ultrafiltration (UF) is a low pressure membrane filtration process similar to microfiltration, which utilizes low pressure to pass water through a 0.1 micron porous membrane. The membrane will remove particulate matter, including partial virus removal and better Total Organic Carbon TOC removal. The membrane filtration technology has been used for years in pharmaceutical, food processing and other industries. The technology has been used for water treatment for about 15 years, and only recently in the Midwest.

The decision to use membrane filtration versus media style filters involved a few additional factors:

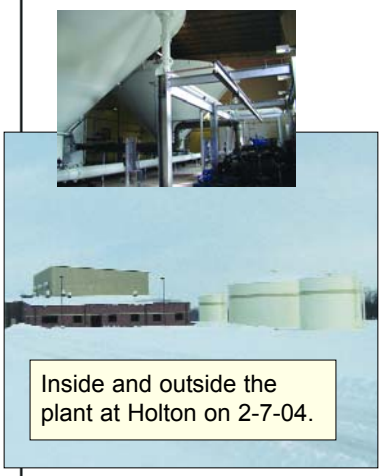
- The footprint of the water plant was relatively limited
- Membrane filters allowed the plant to be expand in an economically feasible manner
- It provided an ability to meet new tighter regulations on finished water quality for surface water treatment facilities
- Membrane filters are integrity testable for ease of operational maintenance
- Allowed for the removal of cryptosporidium
- Membrane filtration is automated, so the plant could operate unattended.

"Ultimately, utilizing membrane technology was the best solution," said Mears. "City staff and the rural water district looked at many different options, including traditional filtration, but selected membrane technology. We anticipated growth, now we will be able to meet it. Residents had experienced forced conservation; we were able to address their primary concern by providing safe, reliable, quality water supply."

The PWWSD No. 18 water plant was funded through a combination of loans and grants from United States Department of Agriculture Rural Development. The district met eligibility requirements for up to 55 percent of the project cost through grants and a loan financed at the "intermediate" interest rate. The two project partners then evenly split the costs of building the treatment plant and absorbed the cost for pipeline distribution expenses required for water delivery to the respective entity.

PWWSD Nº 18
PROJECT SPECIFICATIONS:

- Currently has a capacity of 2 mgd or 1400 gpm with future capacity of 3 mgd
- **Head Tank:** 12 ft. diameter by 30 ft. high, operating volume of 21,150 gallons
- **Claricones:** 24 ft. 9 in. high. Top diameter of 43 ft. Volume of 73,100 gallons
- Each membrane skid has a capacity of 1 mgd with 30 modules in place
- The addition of remaining 20 modules will give each skid a capacity of 1.50 mgd
- **Membrane Feed Tank:** 22 ft. diameter, capacity of 54,000 gallons
- **Chlorine Contact Tank:** 34 ft. diameter, capacity of 174,000 gallons
- **Ground Storage Tank:** 62 ft. diameter, capacity of 550,000 gallons



Inside and outside the plant at Holton on 2-7-04.