

Bonner Springs Constructs New Filter Backwash Settling Tank



The water system improvements at Bonner Spring, KS include this 130,000-gallon glass-lined settling tank where iron and manganese settles out in the treatment process.

The city of Bonner Springs is located in Wyandotte County just outside of the Kansas City area. The city currently has a population of 7,100 and approximately 2,200 water services. The city has five wells that provide the city's water supply; presently Well No. 4 is offline due to high manganese content in the water. The city recently plant recently completed the installation of two sand and anthracite filters that have the capacity to treat up to 1.44 million gallons per day. As of May 28, 2015, the plant is processing 800 gallons per minute and uses a backwash rate of 1,700 gallons per minute.

The city of Bonner Springs' water treatment plant uses oxidation followed by pressure filtration to remove iron and manganese from the well water. The wells draw water from

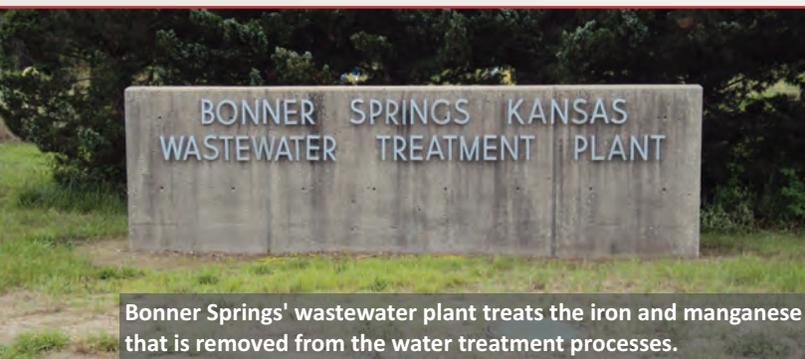
The city of Bonner Springs' water treatment plant uses oxidation followed by pressure filtration to remove iron and manganese from the well water.

the Kansas River alluvial aquifer. Iron and manganese are removed by oxidation with potassium permanganate followed by coagulant (polymer). Treatment plant pressure filters are cleaned to remove accumulate particles by backwashing with treated water from the distribution system. In 2010, the Kansas Department of Health and Environment (KDHE) issued a Schedule of Compliance requiring the city of upgrade the treatment plant so that backwash water discharged to the Kansas River met total suspended

solids (TSS) effluent limitations.

Two primary alternatives to upgrade the filter backwash discharge were evaluated: 1) construct a "red water" settling basin; or, 2) construct an aboveground backwash settling/equalization tank. The settling basin would retain backwash water long enough to provide settling before discharging the supernatant to the Kansas River and settled solids to the sanitary sewer; or slowly discharging all backwash water to the sanitary sewer. KDHE required a dechlorination chemical feed system to remove residual chlorine from the water being discharged to the Kansas River. The city chose to use sodium disulfate for the dechlorination process.

After evaluating all of these options, the recommended alternative was the construction of a settling/equalization tank by either relocating an existing, unused welded steel tank or by construction of a new glass-fused-to-steel lined bolted tank. The estimated cost of the project was



Bonner Springs' wastewater plant treats the iron and manganese that is removed from the water treatment processes.

\$385,000. The estimate included construction of a 130,000-gallon tank with foundation, site piping for gravity discharging backwash water to the sanitary sewer, and a dechlorination system.

A contract was signed with Engineering America for the installation of the tank. The settling tank is 30 feet in diameter and is 24 feet tall. It was constructed with an open top to reduce costs. The city obtained a loan from the Kansas Public Water Supply Loan Fund for the project. The Loan Fund is administered by KDHE.

Bartlett & West, Inc. was the engineering consultant. The engineering fees consisted of: design phase service fees totaling \$38,000, bid phase service fees totaling \$6,000, and construction phase service fees totaling \$31,000 for a total of \$75,000 for the engineering costs.

KDHE required the city to have the total suspended solids (TSS) levels less than 100 milligrams per liter (mg/l) in the discharge water to the river. Currently, the TSS leaving the settlement tank are 10 mg/l. KDHE requires monthly sampling for TSS. Currently Pace Analytical of Lenexa performs the tests. This met the Schedule of Compliance issued by KDHE. The tank has been online for approximately 60 days and has yet to discharge any tank sediment to the sanitary sewer to; the discharge rate will be 25 to 50 gallons per minute.

Other water districts in the area that also have backwash reclaim tanks include Douglas County RWD No. 3. RWD 3 has a 56,000-gallon filter backwash reclaim tank. Another system, Pottawatomie County RWD No. 4, has an 11,000-gallon filter backwash reclaim tank.



This photo shows the two sand and anthracite filters that treat the city's water for high iron and manganese.

I appreciate the opportunity to be of help to cities and RWDs in eastern Kansas. My additional work with the city of Bonner Springs includes leak detection. I encourage any city or RWD that has any issue with their water or wastewater utility – from rates to loan/grant applications to leak detection – to contact KRWA. Email me at Tony@krwa.net or call me directly at 913-370-0097 or call the KRWA office at 785-336-3760. Help will promptly be on the way.

Tony Kimmi has worked as a Tech Assistance for KRWA since October 2009. He has extensive experience in the operation of construction equipment. He has assisted in the construction of several rechlorination stations and ongoing monitoring of water quality issues. Tony enjoys providing assistance to public water systems.



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