

City of Herington Tries New Water Treatment Pilot Plant

The city of Herington is needing to replace its aging water treatment plant. Herington is a town of about 2,500 population. It is located primarily in Dickinson County but also stretches into Morris County. It is mostly a bedroom community with its largest employer being the Union Pacific Railroad. The city provides finished water to the cities of Hope, Woodbine, and the city-owned airport and surrounding area north of the airport. The airport was an army airbase during World War II. The water is supplied by a reservoir that was built in the early 1980s. The Herington reservoir is located several miles west of town.

The present city water treatment plant was constructed in the 1920s; several additions have been made in the decades since. The building housing the filters and high service pumps has reached its useful life expectancy. The newest addition was a contact basin for chlorine and ammonia built in 2006. The city has had problems over the years with complying with disinfection by-products limits in the drinking water, especially during the summer months.

The city has decided to go with Wes Tech Engineering's Trident HS Multi-Barrier Package Water Treatment System. The pilot plant has been approved by the Kansas Department of Health and Environment (KDHE). The plant is presently being operated on a small scale, about 20 GPM, to check performance results. The entire plant is housed in a semi-trailer and is connected to raw water and drained to the sanitary sewer.

Stage 1 - Chemical Conditioning / Tube Settling

Before water enters the treatment unit, coagulant and polymer are added to begin the coagulation and flocculation



Portable pilot plant.



Compressible and buoyant media in adsorption clarifier.



Monitoring equipment.

process. A sludge recycle flow is introduced near the coagulation point to aid in floc formation. This recycle flow also serves to maintain a steady-state solids concentration, minimizing variations in influent solids concentration.

For plants incorporating enhanced coagulation, the tube clarification stage reduces influent solids concentration prior to the adsorption clarifier stage, leaving the majority of coagulated particles in the tube settler clarifier. For cold water conditions, the tube clarifier provides added detention time.

Stage 2 - Enhanced Clarification

A combined bed of both compressible and buoyant bead adsorption media provides second-stage clarification. The adsorption clarifier media further reduces solids prior to filtration. Captured solids are periodically flushed from the clarifier using an air/water combination. Tube-clarified water is used for the flushing process.



Dirty filter before backwash.



Dirty adsorption clarifier before backwash.



Clean adsorption clarifier after backwash.

Stage 3 - Mixed Media Filtration

Mixed media filtration removes the remaining solids using a bed of anthracite, sand, and high-density garnet supported by a direct retention underdrain. For improved filtration, the media surface area per volume increases from top to bottom and the backwashing process incorporates simultaneous air/water backwashing and baffled wash troughs to prevent media loss and assure clean media.

The city's present plant is operating at 260 gpm with the pilot plant skimming off 20 gpm for the study. So far, the pilot plant has been removing turbidity from 3.5 NTU down to .02 NTU. Seventy-five percent of TOCs were removed using ferric chloride and 55 percent removal using aluminum chlorhydrate. The ferric chloride did lower the Ph to 6.8; it would need to be increased. All backwash water of the proposed plant will be captured and the clear water after settling would be returned to the plant to be reused.

Ozone will also be used ahead of the plant to help minimize algae growth and start the disinfection process. Total chlorine will be added before the clearwell.

The city staff says it has been a long process to bring the pilot plant to the state of the present study. They have been pleased with the performance of the plant and are hoping for approval from KDHE for the full-scale plant. Herington is looking at two HS-700 Trident tanks that are capable of 350 gpm each. In the summer, both plants would need to be operated in parallel. The estimated costs of the plant upgrades are expected to be

\$3.7 million. The experimental runs were completed with the pilot plant before May 1.

Additional information about the project is available www.westech-inc.com.

Bret Beye joined the KRWA staff in March 2017. He previously worked for 30 years at the city of Herington where he was Water Distribution and Sewer Collection Foreman. A Class III water operator and certified as a backflow device technician, Bret also served on the USD 487 Board of Education from 2003 to April 2017 where he was board president and vice-president.



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