

A photograph showing two men in a grassy field. The man on the left is wearing a dark plaid shirt and a baseball cap with 'KRWA' on it. The man on the right is wearing a light-colored plaid shirt, sunglasses, and a baseball cap. They are both looking at a large, grey, cylindrical pipe section that the man on the left is holding. The background shows a line of trees and a clear sky.

Pigging Raw Water Line Helps Improve Water Quality

Recently the Kansas Rural Water Association (KRWA) received a call from Harold Hunzeker, operator for Nemaha Rural Water District No. 1, requesting assistance in cleaning the raw water line from one of the district's wells.

Located in northeast Nemaha County around the community of Bern, the district serves water to 146 rural patrons and also sells water to the town of Bern. The well in question is one of two wells located northeast of Bern. A 2.5-mile transmission pipe line connects these wells to a booster station that pumps the water into the distribution system and storage for the district.

The district has a pressurized filtration system to remove sediment. The unit holds three (3) filters which are ten (10) micron Strain Rite filters. The district purchases the filters from ProWest Filtration. The cost is \$100 each time all three filters are changed.

KRWA Tech Tony Kimmi explains the pigging process to Harold Hunzeker, operator at Nemaha RWD 1. The district operates six wells. They produce water at rates of 26 to 80 gallons per minute.

These filters should last from one to six months before it is necessary to change them. Two of the district's wells pump a very fine sand; the water is high in iron and manganese. A pressure gauge at the district's booster station shows the head pressure when the wells are operating. When the pressure reaches a certain level, that indicates plugging of the bag filter systems. Operator Hunzeker then replaces the filters and the head pressure decreases. Recently, the run time between filter replacement became shorter and shorter. Filters were needing to be replaced every seven or eight days.

After a review of the situation, it was the mutual decision of the district and KRWA to pig the water line from the

well to the booster station. The cleaning process would be completed with the use of foam swabs. The swabs would remove any foreign material from the inside of the six-inch PVC pipeline.

Entrance and exit points already installed

When pigging a water line it is usually necessary to excavate the line at the point where the pigs will be inserted. It is also usually necessary to excavate at a point where the pigs will be removed from the line. In the case of Nemaha RWD 1 the district had installed a gated-wye close to the wells where the pigs would be inserted and another wye where the pigs would be removed. The access and egress points

were installed on a prior pigging project. In anticipation of possible future pigging, the installations were made permanent.

The pigging process would require up to an estimated four hours of time. The district confirmed that all storage tanks were full and that other wells were operating satisfactorily. KRWA Tech Assistant Tony Kimmi and I assisted Harold with the cleaning process. The exit point was checked; and two six-inch foam swabs were inserted into the line. Two wells were then turned on to provide the water and pressure needed to push the pigs down the line and remove the sediment, iron and manganese deposits from the interior of the pipeline.

The 2.5 miles of pipeline holds approximately 19,400 gallons of water.



Nemaha RWD 1 operator Harold Hunzeker shows KRWA Tech Tony Kimmi one of the new filters that is used each time the filters need to be replaced. Three filters cost approximately \$100.

It required 2.25 hours for the pigs to pass through the pipeline. A calculation indicated the two wells produced 143 gallons per minute during the pigging process.

It's easy to become a bit unnerved during a pipeline pigging project, waiting for the pigs to exit the pipe. This is especially true when water stops flowing from the exit point. When the terrain is uneven, the swabs will be pushed up the inclines in the pipeline, water ahead and behind the swab keeps the pipeline filled. However, when a hill is crested, the water in front of a swab often flows forward faster than the velocity of the water behind the pig. The result is a void or air pocket between the swabs and the exit point.

Yes, pigs sometimes can become stuck in pipelines. It is essential to know the route of the line being pigged and make sure that all services or branch lines are closed.

Good results

The photo at left shows the slurry of discolored water containing a high level of iron and manganese deposits and fine sand being flushed from the pipeline. Operator Hunzeker reports also that he replaced the

filters when the cleaning of the line was completed. A month later the filters still do not need to be replaced. It is not unreasonable for the filters to remain in place for two or more months.

Cleaning of the line has saved the district the expense of replacing the filters every week. For each month the district does not have to change the filters \$400 in savings is realized. The only cost to clean the lines was the cost of electricity to pump the water and the cost of the foam pigs. KRWA provided assistance on this service as a benefit of the funding through the Clean Drinking Water Fee, through a contract administered by the Kansas Water Office.

Cleaning water lines has the potential to benefit many systems. KRWA advocates that all new pipelines be pigged as part of the flushing and disinfection process. Using foam pigs on new lines requires only about 25 percent of the water that would otherwise be used to adequately flush the pipelines. Please call KRWA to learn more about pigging lines; KRWA staff will be pleased to share their experiences.

Greg Duryea has worked for KRWA since 1993 as Technical Assistant. He holds a Class I water certification and is the certified operator for Sycamore Springs Resort in Brown County.



Tony Kimmi prepares to insert the pig in the gated-wye that the district installed years ago in anticipation of additional pigging projects.



Cleaning the 2.5 miles of 6-inch PVC pipeline removed a lot of sediment from the interior of the line. Most of the sediment was a very fine sand and the color of the discharge indicates that iron and manganese are also in the water.