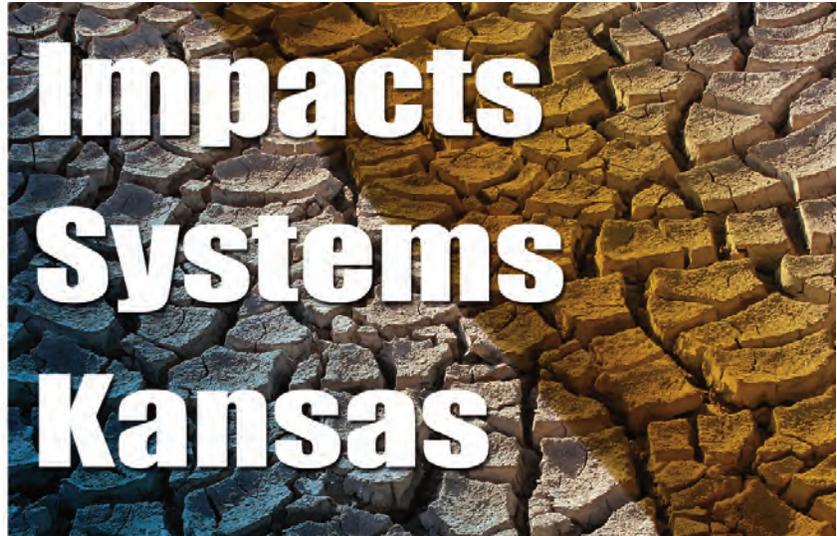


Drought Water in Impacts Systems Kansas



The extended drought of 2012 is impacting numerous public water systems in Kansas. Many cities and rural water districts have implemented voluntary, and some have requested, mandatory conservation measures. The benefit of having water conservation plans has paid off for some systems that I am aware of, in cases, helping to reduce usage which was outpacing the systems' pumping or production capacities.

The city of Bennington, located north of Salina, is a small community of 675 people. That area has suffered from a 20-inch deficit of rainfall in 2012. Bennington's water source is from three wells. Wells 8 and 9 are the newer of the three; those were constructed in the mid 90's. Well 5 has been in use since the 1950s. Well 8 and 9 have submersible pumps rated at 300 gpm. Well 5 has a turbine pump that normally

pumps 150 gpm; historical pumping records on this well do not exist. Well 5 is located on the southeast edge of the community while wells 8 and 9 are located on the northwest edge of the community. They were installed along a drainage stream that runs from the north toward the Solomon River. All the wells pump from the Solomon River alluvium.

When wells 8 and 9 were constructed, the pumps were deliberately over-sized to compensate for inefficiency that was sure to affect the pumping rate someday. I have worked with three different operators on this and I think a pumping rate of half or slightly more would have better served the community. These wells, even in good times with optimum water levels, could never provide 300 gpm each. Back in 2004, I was called to help as the city was experiencing air in the distribution system. I soon found that Well 8 was the causing this problem. The isolation valve was accidentally opened all the way and the pump would break suction at about 150 gpm or even less. And this was at a time when water levels were at their highest. We adjusted flows from both wells to be 100 gpm to 124 gpm to stop air from being introduced into the distribution system. Another anomaly of these two wells when operated at the same time with production at 125 gpm each, the production is not going to be 250 gpm but closer to 190 gpm. These wells share the same pipeline to the master meter and chlorination building before entering the system.

In June 2012, the system again experienced air entering the distribution system. I returned to Bennington. Familiar with the system, I know that it requires two people to properly adjust the pumping rate. One person needs to be at the meter and the other person needs to be at the isolation valve on the well that's being adjusted. When the pumps were throttled to 100 gpm each, the total production was only 125 gpm, but air was no longer being pumped. When operated singularly, air was being introduced. I concluded that backpressure from each pump reduced the air pumping.



Wells at the city of Bennington have had a variety of maintenance over the years. This photo from 2004 shows a maintenance rig on Well 8.

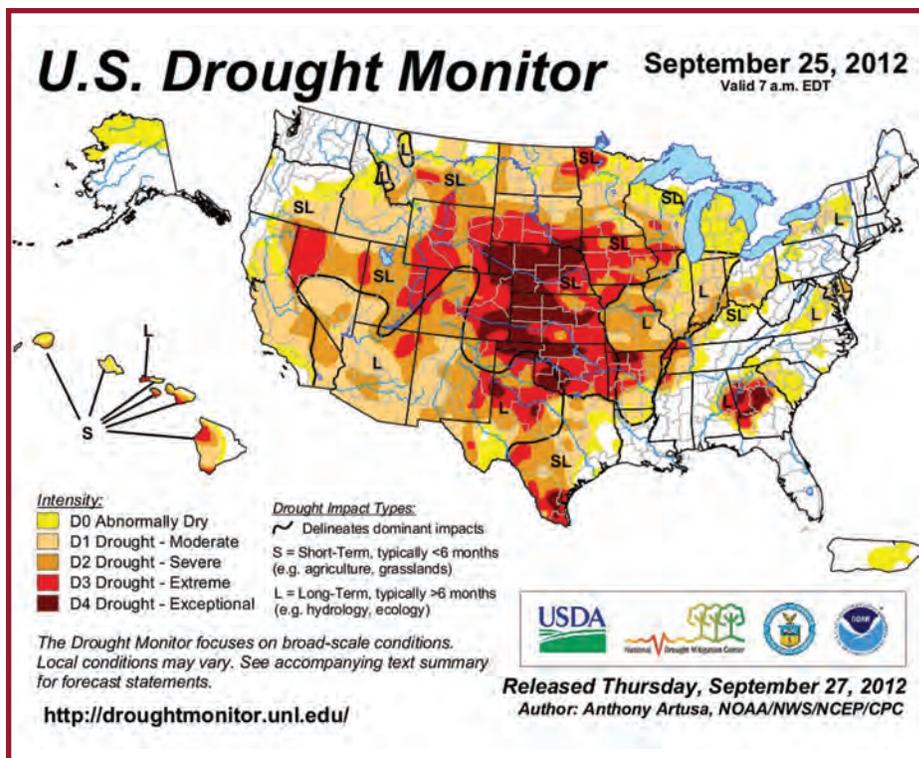
By July, air was again being pumped. I suggested to the city that the pumps should be pulled and that the casing and screens be acidized and the wells be bailed to improve production capacity. Drawdown tests showed only one to two feet of water above the intakes on the pumps. And at only 100 gpm, the pumps were producing high pressure surging. An S drive or variable frequency drive was recommended.

After that work was completed, Well 9 suffered a foot valve failure. This caused a section of the connecting pipeline to drain back into Well 9, which resulted in more problems of air in the system. The pump in Well 9 was pulled and repaired. Two weeks later, Well 8 had O-rings that failed on the pitless adaptor, likely caused by the high pressures produced by the reduced production rates. The pump in Well 8 was pulled and repaired. While repairs were being done on these two wells, Well 5 was the city's only source of water. Well 5 also has an S drive and can support the system even when the water storage tank is out of service.

Just as the repairs for wells 8 and 9 were finished, Well 5 began pumping air and the production meter failed. The pump was pulled; a coupler that the pump was hung on had eroded and began leaking. Had that not been detected, the pump could have been lost. The casing and screen was acidized and cleaned while the pump was repaired. During this time wells 8 and 9 pumped a combined 100 gpm to supply the system.

Pulling together

There are many details in this case and some won't be significant to anyone else. But I write about the problems at Bennington because the folks there have had their share of difficulties to ensuring that the community has a water supply. Their work is critical. Too often, many people seem to take their water supply and water source for granted. That's not the case in Bennington. Hopefully with diligent attention to the operating conditions, pumping rates and the water table, Bennington and similar other communities will get through this period of drought. But the forecasts are not promising that the weather will change anytime soon.



If there is anything that I could change it would be so more people would understand the difficulty that many of our smaller communities face in ensuring vital utilities are available for their citizens.

It's imperative that water systems have updated water conservation plans, trained operators and boards or councils who take positive action to address problems. There are only a handful of people in most communities who make sure their towns or RWDs provide good service. They are often unappreciated and often they are not thanked. If there is anything that I could change it would be so more people would understand the difficulty that many of our smaller communities face in ensuring vital utilities are available for their citizens. The people

who work at Bennington and the city council make a real a difference and they and others in other communities are to be commended. We can worry about upcoming regulations or fret about water rates – that won't make a drop of difference were it not for the commitment of local citizens who help provide these services. It's past time that the local human capital gets the attention it deserves, whether during periods of drought or flood.

Doug Guenther has worked as Technical Assistant for KRWA for 11 years. Doug worked for the City of Oakley in the Water and Electric Department for 8 years. He has also worked several years for an industry supplier. He is a Class II Certified Water Operator.

