By Jon Steele, KRWA Technical Assistant

City of Hugoton's New Well Set at 1,200 GPM

Interior of new well house

Hugoton, Kansas, with a population 3,904 according to the 2010 Census, is located in Seward County in extreme southwest Kansas. The city recently completed the installation of a new well as an investment in the future.

The city has 1,700 water service connections. The city experiences hot, dry summers and cold, dry winters. The average temperature is 55° F; the average annual precipitation is 18.4 inches. Snowfall averages 10.4 inches. Established in 1885, the community was first named in honor of French writer Victor Hugo, but later changed the name to Hugoton to distinguish it from Hugo, Colorado. A post office was established in 1886.

Natural gas was discovered in the arear in 1927. The Hugoton Gas Field is the largest in North America and second largest in the world.

Water rights are always an issue on the high plains and generally are highly sought. Fortunately for the people of the plains of southwest Kansas, the Ogallala Aquifer, although declining, provides needed water for domestic use and of course, irrigation.

A new well – tested at 2,500 gpm, set at 1,200 gpm

Hugoton presently operates seven wells that pump from the Ogallala Aquifer. The capacity of the wells ranges from 500 to 1,500 gpm. With 574.2 million gallons available under water rights, the city actually has enough water rights to supply their current needs. However the decision to develop another well was more of an investment in the future of the town rather than being a response to a shortage of water rights. Like many smaller Kansas communities Hugoton still has an abundance of small diameter cast iron main lines that were part of the original water system. The area of the new well was perfect to boost water production to the southwest part of town where demand was high. The city obtained another 114 million gallons of water rights by purchasing the irrigation water right. The full value may be realized in the future if more development occurs as has been the case over the past several years with a new motel, milk production facility and a new large ethanol plant.

Well design

The new well was drilled 585 feet deep; the static water level is 202 feet. A 24-inch diameter borehole was drilled and a 16-inch diameter .375 inch thick casing was installed. After the pump and motor were set the well was test pumped at 2,500 gpm and maintained a pumping water level of 210 feet after four hours for only eight feet of drawdown. Drawdown is what determines a well's ability to efficiently produce water; it is quantified by what is known as specific capacity or yield potential. The Hugoton well is a very high yield well having a specific capacity of 312 gallons/ft. Many wells I work with would range on specific capacity from 10 to 50 or so but very view over 100 gallons/ft.

The well was screened from 325 feet to 575 feet; the gravel pack is from 75 to 585 feet. The well is grouted from the ground surface to 75 feet. The pumping rate was set at 1,200 gpm requiring a 250 hp motor to deliver the water to the surface and overcome system line pressure. Water is

pumped to the city through 1.5 miles of new 10-inch and 8-inch PVC pipe to two ground storage tanks. One is 250,000 gallons and the other is a 750,000-gallon tank. The city also utilities a 750,000-gallon elevated tank.

Exterior of Hugoton's new well house and chlorination

Water quality issues

When searching for a new water source basic water quality parameters should be considered first before proceeding. If the basic inorganic analysis are found to be within acceptable parameters then a community can proceed to develop the well. Some basic water quality parameters at the Hugoton well are: Iron at .11 mg/L; Manganese is .002 mg/L; Total Hardness is 330 mg/L; Sulfates are 350 mg/L; Nitrates were a low 0.6 mg/L, Chlorides were less than 1.0 mg/L. Although non-regulated the hardness is typical of most groundwater but is on the high side; the sulfates are also high which can have a laxative effect on those not use to high sulfate water.

Funding was from utility reserves

The city implemented a capital improvement fund in 2006 in anticipation of water system improvements. Part of that plan included a $10 monthly charge on each water bill to fund upgrades. Current water rates are $21.50 minimum charge including the $10 capital improvement charge; all water used is charged at $1.05/1,000 gallons.

The city was able to fund the entire project in house with cash on hand of $591,000. In addition the water rights had to be purchased from the land owner at a cost of $850,000; that too was completed from cash reserves. The contractor on the job was Hydro Drilling, Garden City, Kan. and King Enterprises from Liberal, Kan.

Jon Steele has been employed by KRWA as a Circuit Rider since 1995. Jon is certified as a water and wastewater operator. He has more than twenty-five years experience in public works, construction and industrial arts.