

Bentley tower maintenance is routine with a twist

Situated 14 miles northwest of Wichita, Bentley, Kansas sits in the middle of a triangle formed by the larger metro areas of Wichita, Hutchinson and Newton. The Sedgwick County city of about 425 people is considered part of the Wichita metropolitan area.

The town Web site describes it this way, “This town offers a quiet alternative to the challenges of living in a larger, more congested metropolitan area. The availability of an excellent school system and the close proximity to larger areas of employment opportunities, along with the serenity of its rural setting make an ideal place to locate.” Another reason for growth in Bentley is explained by Bentley Public Works Director Eric Purk, “Bentley offers the next available

Meadows, outside the city, has 18 one-acre lots and is nearly half full.

Bentley now has a mandatory water and wastewater hookup rule for new home owners. Nearly 80 percent of Bentley is now on city water but gradually residents with wells are switching over. “A few grumble a little when switching to city water, but I quickly explain that they also are getting reduced insurance costs, better fire protection and most of all clean, safe, drinking water for their money,” City Clerk Laura Fisher said.

Bentley is recognized locally as the home of the Road Kill Café – a popular gathering spot serving fine food for local residents and visitors. There’s a town landmark, a huge cottonwood tree, at 201 S. Wichita known as “Big Bertha.” The small downtown area and these landmarks

still look much the same as they did years ago – but the town is changing.

In previous *Lifeline* articles I have written about the challenges that Bentley’s waterworks department has faced over the years. Bentley purchases raw water taken from a 48-inch Wichita

development west of Maize, which is getting a little expensive and a little less rural.”

Hometown Bentley

As they say, “If you build it, they will come!” The city is growing – thanks to several new subdivisions

people are populating Bentley. In 1979, the 41-lot Johnson addition started with only eight homes and then sat dormant for years. The developer returned in 2001 to put in water, sewer and streets and an additional 16 homes have been built since. A new 61-acre development, Castle Estates, was then annexed and platted for 151 lots. A now full 16-lot Dawn Estates addition was started about the same time. Bentley



Jon Steele,
Tech Assistant



Above: Bentley City Clerk Laura Fisher retrieves some paperwork for Bentley Public Works Director Eric Purk. **Above right:** Development direction signs show prospective home buyers the lots available for sale in Bentley.

pipeline transporting water from 55 wells in the Equus Beds wellfield to Wichita. Bentley then chlorinates the water and pumps it to the town's water system. The Equus Beds Aquifer is the eastern-

most part of the High Plains Aquifer system. It has abundant water of varying qualities located at relatively shallow depths with good saturation depth (ranging from 50 to 250 feet). It is an

important source of water for irrigation, industry, and municipal and private drinking water systems. The larger cities of Hutchinson, McPherson, Newton, and Wichita all obtain drinking



Above: Eric Purk, in his safety harness, emerges from the Bentley storage tank to start on work modifications to the hatch and riser access pipe.



Center: Jon Steele inspects the riser top that will be extended to top of the tank where a new hatch will be built. This will change the riser pipe exit route to the tank's exterior.



Right: Jon Steele puts finishing touches on the fitting welded to replace the one that ruptured.

water from the Equus Beds as well as several small cities and others such as Bentley, getting water indirectly through Wichita.

Maintenance made possible

From November 8, 2006 until New Year's Day the Bentley water system had operational challenges



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by being without the benefit of their water storage tank due to tank maintenance. Several years ago I attended a council meeting to discuss possible modifications to the city's pump station because

of the water's turbidity. Occasionally there is turbid water coming from the Wichita wellfield.

"The raw water we purchase in the winter has characteristics that may change weekly. This is

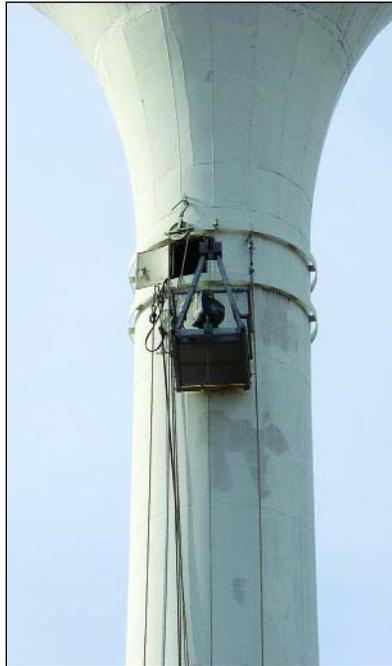
because water is pumped from different wells at different times allowing for maintenance on large transmission lines or rehabilitation work on Wichita's wells. This maintenance is easier to do during a



Above: Jon Steele, in his safety harness, inspects vendor's work on pipe insulation and ladder bracing.

Center: The access hatch at the tank's first landing had been painted shut and was not functional. It was substantially modified, which required some outside work.

Right: Maguire Iron's tractor and trailer is on-site to begin sandblasting operations to clean the tank's interior.



time when less water is needed in Wichita. During the peak summer season, they may pump from all 55 at once," Purk noted. To alleviate the problem of intermittent water turbidity, the city agreed to and installed a meter to monitor the turbidity. With the benefit of the turbidity meter, Bentley's pumps now shut down if turbidity from the Wichita transmission line is above a set point. The result is that the Bentley system doesn't take on water with high turbidity. Once the water clears, the pumps again operate. This setup works great so long as Bentley system has water in reserve in the storage tank.

After council meeting discussions, Bentley also installed variable frequency drives a few years back on the pump motors at the pumping station. The drives proved to be a good investment as they played a crucial role in controlling the pumping station during the tank maintenance project. By installing a pressure transducer at the pump station the drives could be adjusted to operate the system at a desired pressure. Initially, Eric was a little skeptical about operating the system on the drives alone. I reassured him the arrangement would work out fine;

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the scenario of having no water in storage would put the drives to the test. The units were adjusted and the tank was taken offline. The result was that the drives performed extremely well, even better than

Purk exclaimed. “Without tank storage, we couldn’t shut down and let the turbid water bypass our tap. That Saturday we had to wildly keep changing filters – one per hour at the start. The changes tapered off

access hatch at the first landing and the central riser in the tank stem needed extending to the very top of the tank. The riser had the ability to act like a chimney, terminating two feet below the inside tank top. With



Above: To make sure it is safe to get the tank back on line, Jon Steele caps a sample bottle to submit to a lab for a test of bacteriological quality. This hydrant is at the base of the tank and is regularly used as the sample site.

Right: The Bentley storage tank looks good after repairs and new coatings were applied both inside and out.



expected, holding water pressure in Bentley at a near constant pressure. Water users in Bentley noticed no difference. The system was operated without a storage tank for eight weeks. These drives proved invaluable, as too often, tank maintenance will otherwise involve using a pressure relief blow off. Under that type of arrangement, a lot of water can be wasted. When water is purchased, the wasted water during tank maintenance can become a major cost. The recent tank maintenance project also presented unexpected complications.

Problems during maintenance

One of the unexpected problems mentioned above, became immediately apparent when a major break in a large Wichita well-field water main, and subsequent repair inadvertently let a volume of soil and debris into the transmission line. “The second weekend after Thanksgiving was a nightmare,”

during the weekend but not before wrecking our chlorinator. I am glad we had one in reserve. We still saw the effects of this for two weeks because the turbidity slug filled up the city lines during that weekend.” The system ended up going through 60 to 70 filters during a 72-hour period.

Routine maintenance

Bentley’s 100,000-gallon storage tank had several problems besides the need for sandblasting and resurfacing of interior surfaces with the epoxy coating and an exterior paint job. Eric and had I noted some of these deficiencies in 2004 when I helped the city clean and inspect the tank. Foam insulation was peeling from the overflow pipe and the ladder needed to have additional braces welded in place to make it safer. Other items included modification of the handle on the

the access door open below, it could allow dirt and debris to be drawn up inside, over the top and possibly contaminate the water.

The only glitch in the process was when a fitting blew on the fill pipe as we were refilling the tank. We welded a new fitting and started the refilling a second time.

The last steps to get the tank back online was to disinfect the tank maintenance hydrant, located at the storage tank, in order to check the chlorine residuals and bacteriological quality before putting the tank back into service.

The rehab work on the tank was done by Maguire Iron, Inc., Sioux Falls, South Dakota. The cost of the work was \$58,330 and brought the storage tank up to OSHA and AWWA standards.