

A Look at the City of San Augustine Water System

I seriously doubt there is anyone in San Augustine City or County who does not know that last month's severe ice storm caused a major failure of the City's ability to supply fresh drinking water, so let's take a look at where and how the city makes its drinking water as well as the causes of the problems we had the week of February 15th.

The city produces fresh drinking water using a surface water supply from City Lake reservoir. We maintain a water production plant near the west end of the dam at City Lake. A plant we currently utilize is called a "package plant". It is really sort of a rarity, but it works quite well. It is called a package plant because it shows up on site as a package of modular design ready to produce water. Our plant has two sides which we call basin number one in base and number two. They can be seen in this picture from last summer at our water plant during a time when we were upgrading two pumps that move water from the plant area into our new ground storage tanks.



Caption: City Water Plant during a pump upgrade in August of 2019. If you count the grey pipes you can see they attach to basins 1 and 2. The plant was formerly outside, but has been enclosed in a building over the past few years. The building north end will be completed starting this spring.

Each basin can make about 1.1 million gallons a day, so that's 2.2 million gallons total which is a large amount of water. Once the water is processed in the plant it is moved just north of the plant into 2 new 300,000 gallon storage tanks completed in 2019.



Caption: The 2 new 300,000 gallon water storage tanks (600,000 gallon total) were completed in 2019 to replace an old 500,000 gallon tank that was razed on completion after the new tanks went into service. The old tank could not be taken down for maintenance, but the new ones operate independently, so one can be worked on while the other remains working. The project was a major upgrade to the system.

The water in the tanks, some 600,000 gallons full can then be pumped to town. This is done from a pump house (not pictured) in front of the water plant with the most appropriate of 3 pumps that can pump about 650 to 1500 gallons per minute to town via large pipes. One of those pipes is a large old 16-inch pipe that along with the pump house I just mentioned is scheduled to be replaced with funds from a grant the City applied for last October. Included in the grant application is a replacement for the intermediate pump facility we will get to in a minute.

Once the water is pumped to town from the water plant it first arrives in the mains of the eastern pressure plane of the City. It is a little more complicated than this, but that plane is how we refer to the system of pipes that serve the area roughly east of a north/south line running down Harrison Street. At the top of the system is the water tower located at the Hospital. The water tower is said to “float” on the distribution system meaning it only fills up when the east side pipes are full and in service.



Caption: The water tower at the Hospital hold 500,000 gallons, and it floats on top of the distribution, meaning it only fills up when the pipes in the east side fill up first. It was a piece of equipment at the base that failed in the Ice Storm that caused so many of our problems.

It was at the base of this tower that a key piece of the water system controls failed in the storm, but first on to the rest of the system. Once the water is full in the pipes of the east side the tower will fill up, and water pressure from this side will travel across town via a single 6-inch main that runs down Water Street and across a creek to the City's mid-town pump station. At this pump station water accumulates under gravity flow into a 100,000-gallon ground tank that is then pumped by one of two pumps up through several mains to serve the west side pressure plane atop which sits the water tower on Highway 96. It is important to note there is no direct connection from the water plant to the west side of town, and all the water must pass through the 6-inch/tank/pump combination to reach the west side. That is asking a lot of plumbing which is largely 50 to 70 years old and long since outgrown. The west side additionally serves nearly all the rural water system, and is by far the more taxed area.



Caption: The water tower on Highway 96 also stores 500,000 gallons, and just like at the Hospital, it floats on top of the distribution, meaning it only fills up when the pipes in the west side fill up first. It is difficult to fill this up in normal times with the limitations of the City's pumping facility in mid-town.

The mid-town pump station that fills the west side up with water is a third element that we applied to fund a replacement for last October. If approved, the grant also outlines a means of direct fill from the water plant or at least more direct connections between the two sides of town. As I said earlier the plant may be able to crank out 2.2 million gallons a day, but we can't get very much of it into the western side of town very quickly. The City has called in help from the City's current Engineering firm, KSA, as well as a system operational consultant from the Texas Commission on Environmental Quality (TCEQ) to discuss operations, pumps and capacities. It has been determined the City cannot run the equipment any more efficiently than it is now being done. There were just a few small items that can only affect our rates in a very small way. We are utilizing those, but we are talking about just a few gallons a minute while we need an extra several hundred gallons per minute. This was the fiasco of the past few weeks after the system was completely emptied trying to get water to stay up in the 96-water tower.

The City performs a usual plan to get ready for hard freezes that involves general practices of preparing, all of which you might expect like wrapping pipes and fueling generators, etc. Also, the plan includes applying heat to critical components and enclosing them in structures. Such was done at the Hospital water tank, but none the less, when the temperature reached and stayed in the low single digits, the unit that communicates from the water tower to the water plant froze, and was effectively destroyed. This caused the water plant to shut down after which the extreme cold froze some of the plumbing in

the exposed north end of the plant. This too was heat protected, but not enough unfortunately. These issues caused both pressure planes to be completely depleted before we could restore plant production. The pipes were carefully thawed by workers, but the system, now running on manual control, was depleted long before that could take place. We did have some leaks, but water loss, especially in the west, was not a central issue. We could not safely dispatch technicians to effect repairs on either the water or the power for that matter until conditions were safe for City forces to be on the road. Later, after we were back in production the leaks were rapidly repaired. Many leaks including several that cost us the entire contents of the 96-water tower have been repaired and also several avoided.

The City Superintendent, Chris Anding, conducted a fantastic and well prioritized systematic work plan to restore the water to both sides of town. At one point one of our Texas Department of Emergency Management representatives told me the number of system issues across the state had actually come down to 1700 systems. The Governor of Texas said this was "like a hurricane hitting all 254 counties of Texas at the same time". There are still some boil notices out there even now.

Some of our lessons learned this time through the storm include better communication, and enhanced protection of key elements with better structures for low temperature protection. The last point applies to the delicate instrument at the Hospital tower that froze. Also, it applies to the water plant, but it will really be a non-issue once the final wall is installed there with a grant award we have already been approved for. The point on communication will be a function of an enhancement to the City website that can blast out email updates. We have been short on staff to administer the email database, but we will find a way to do it anyway. I found even a 5-minute conversation everyday with key people and customers can kill several hours. The good news was the excellent uptake on informational updates borne over the internet by Facebook and the original that still lives on the City Website as an alert. You can see updates there during such time by surfing to www.cityofsanaugustinetx.gov. There is actually a wealth of good information there at any one time, and you should make it a favorite for just such times as storms. As of this writing, the whole history is still up on the site under a blue banner. The water tower out on 96 is not yet full, and I have not wanted to take it down until I am sure there are no more updates.