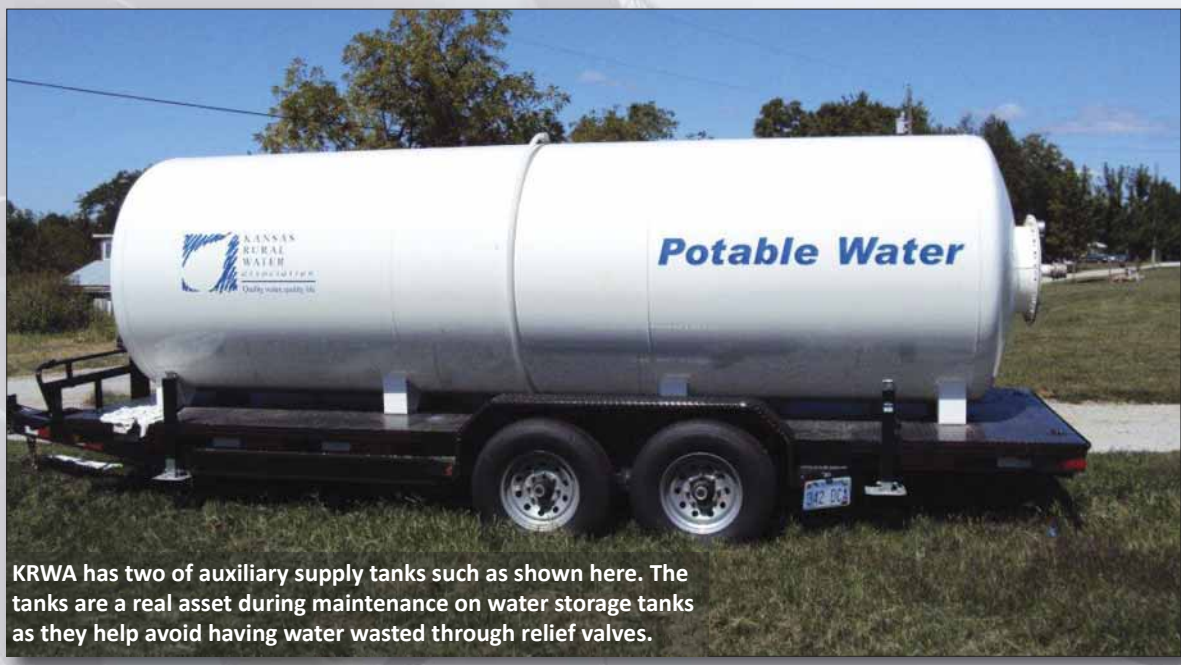
By Greg Metz, KRWA Circuit Rider

The Challenges of Operating a Water System During Storage Tank Maintenance

On occasion, cities and rural water districts must take water storage tanks out of service for inspections or maintenance, including painting or other structural repairs. Planning the project is crucial, but sometimes, as Robert Burns put it, "the best-laid plans of mice and men often go awry".



KRWA has two of auxiliary supply tanks such as shown here. The tanks are a real asset during maintenance on water storage tanks as they help avoid having water wasted through relief valves.

Planning always makes a difference. This is a critical time because taking a water storage tank offline can be risky. Tying a pneumatic storage tank onto the system helps, but operators must remember that there will be a very limited supply of water available. Certainly, it's not a time to have a pipeline break or for firefighting (as if those incidents can be planned). If the supplying pumps cannot provide adequate flow, water pressure will be lost, and a boil water advisory will likely result.

A small city in northeast Kansas had this very thing happen. The storage tank was taken out of service for maintenance. The system was set up to operate with KRWA's auxiliary pressure tank. Use of such a tank is far better than installing relief valves and wasting a lot of purchased water into streets or roadside ditches. Even with a relief valves and pressure tanks installed, the dynamic operation of a water system will likely find any weak spots when the main storage tank is out of service. In this case a valve on the distribution system broke, resulting in a major leak. The system's water supply could not keep up with the leak and the auxiliary tank was draining fast.

I received a phone call from the operator at 4 AM. He was, of course, in panic mode. I reassured him that KRWA would be enroute to help. He checked that all pumps were operating. I suggested closing down some valves to isolate part of the town to not lose all the available water supply. By closing valves, we hoped that the leak could be isolated to a small area of the distribution system. KRWA sent Technical Assistants Tony Kimmi and Greg Duryea on this Saturday morning to the community to assist with locating and fixing the leak.

The problem was located. It was a broken valve. Even with the auxiliary tank in service and a fire hydrant relief valve, we assumed the relief valve was set to open at slightly too high pressure. That was until the valve was excavated. All the bolts were corroded and the valve's top had simply popped off. The valve was replaced and service was restored.

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Bypassing a storage tank is possible when maintenance requires it. The most common step is to install a pressure relief valve and operate the pumps manually for continuous pressure and flow. When the water line reaches a certain pressure, the valve will open and let the water run into the ditch.

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will open and let the water run into the ditch. That can be problematic, especially if you are in a drought-stricken area. Or, as in the case of the project mentioned, a portable tank can be used to help pressure the system. When KRWA installs one of its portable tanks, we will always install a pressure relief valve as a safety.

Variable frequency drives (VFDs) are also a significant asset to operating a dead-headed system without a storage tank in service. A VFD can be operated on a pressure mode. In that mode, the VFD will ramp up and down to increase or decrease flow. A water system can also reduce electrical costs by operating with VFDs. Avoiding the rapid starting and stopping of pumping units will reduce stress on the equipment and prolong its usable life.

No matter what method of operation a system chooses, the primary concern is not having enough water supply for unusual or unplanned demands, such as firefighting. It is always smart to make provisions with the local fire departments to ensure that mutual aid is available from neighboring communities and that the firefighters know that they cannot pump from hydrants due to lack of supply.

One last comment, any time there is maintenance on the storage tank, it's prudent to closely monitor the water quality from the tank or near it. Poor quality, taste, and odor can result when interior coatings are not cured properly. Anyone who suggests that the taste of paint is normal is not being completely honest. Sometimes, a second disinfection of the storage tank may help provide a remedy. ALWAYS have the tank disinfected properly if it is opened up for cleaning, maintenance or inspections.

In every case, taking a storage tank offline is nerve-racking, especially if the city or RWD has a newer operator, or is without this experience. But planning ahead can make all the difference in the world. Don't hesitate to call KRWA. We will be glad to come and assist. We can provide suggestions and directions on what would be the best options.

Greg Metz joined KRWA as a Technical Assistant in July 2009. He previously worked at the city of Washington for 13 years where he was involved in city utilities including the power plant, streets, water and wastewater. He also served as purchasing agent for those utilities.