

# Get Long Service Life with Good Maintenance of Water Storage Tanks

**D**uring my work over the years with Kansas Rural Water Association (KRWA), I know that many public water systems across the state have contacted KRWA and asked about maintenance practices that should be done on water storage tanks. KRWA staff have on many occasions visited with system personnel and members of boards and councils about this topic. KRWA staff have assisted in the inspections and even the cleaning and disinfection of many water supply tanks.

The waterworks industry generally relies on the standards as developed by the American Waterworks Association (AWWA) as guidance on many facets of the operation and maintenance of public water systems. AWWA's publication, Steel Water Storage Tanks: Design, Construction, Maintenance, and Repair is a complete engineering reference guide on steel storage tanks; the publication includes construction and operation and maintenance practices. The 512-page book is available at a fee of \$137 from AWWA.

The perennial question by many smaller systems seems to be, "How often should a water storage tank be inspected?" My reply is that the inspection and cleaning interval can vary based on the type of tank and water quality. Water quality is a significant factor in determining the frequency of inspection and cleaning. Generally speaking, and in my own opinion, a water storage tank should be inspected at least every five years, or more often, depending on local conditions. Cleaning and repairs should be addressed based on the findings of the tank inspection.

Generally, without the AWWA publication to cite from, many people in the waterworks industry also suggest a recommended standard that water storage tanks should be inspected every two years. It is not uncommon that over a period of years a buildup of sediment may develop in the bottom of some water storage tanks. The water quality and treatment practices can influence the degree of sediment. The amount of sediment will vary, depending mainly on the concentrations of iron and manganese in the water. Also, to a lesser extent sediment from precipitation of floc after a surface water treatment plant can occur from instability in the water. For example, iron and iron bacteria will result in the sediment being a red, orange or tan color. In most systems, inspections and washouts every two, three, or four years are adequate .

Some systems have inspections of tanks completed as infrequently as every five to ten years to help reduce the costs that are often associated with the inspections. Like all other facilities, water systems should practice preventive maintenance. Most water storage tank service companies are looking at many areas of the water storage tank such as the interior surface, exterior surface, manways, ladders, and foundation. Some tanks may need small touch-ups on paint while others may need to be completely repainted. At some point, most steel water storage tanks will have to be sandblasted and repainted. Repainting is a very significant cost, especially for a small water system. With the high quality of today's paints recommended for tanks, if workmanship in preparing the surface is good, and if painting follows the specifications of the paint manufacturer, then a good, paint job should last at least five to ten years or longer.

### Scheduling the maintenance

One of the main challenges for water systems is when a water storage tank has to be completely repainted and this work then occurs during the time of year when water demand is high in the

warmer, summer months. Taking the storage tank offline when there is high water demand can result in low water pressures in some areas of the system, or customers even having no supply.

Air temperature and humidity play a big part in the time required for interior paint to properly dry or cure. Even though there may be less water demand on a tank during the cold winter temperatures, it will take much longer for the contractor to complete the project due to the increased drying time due to cold temperatures.

The recommended amount of drying time for each coat of primer and each coat of paint is provided by the paint manufacturer and usually can be found on the can of primer/paint. The amount of drying time increases with colder air temperatures and higher humidity.

It is critical that each coat of primer and paint be properly dried according to the manufacturer's specifications before the next coat is applied. Otherwise, the overall painting will be inferior and may not last a long time. Also, taste and odor in the water can develop from not drying each coat of primer and paint properly. If drying is not according to

specifications, compounds in any undried coat will leach out into the water causing the taste and odor.

Paints recommended for and used in water storage tanks are very high quality and will easily last for ten years or more if the surface is properly prepared and each coat of primer and each coat of paint are applied and dried properly. It is very important to use only primers and paints recommended by the paint manufacturer for tank painting tanks, and that the manufacturer's specifications for installation are followed. There should be no exceptions of using other primers or paints, and no exceptions to following those specifications.

Water storage tanks are very important in the operation of a water supply system. The elevated storage tanks and standpipes in the distribution system help maintain a relatively constant water pressure and provide additional water supply during high demand times. Also, during emergency situations such as power outages, main breaks or fires, the water storage tank is critical to the providing a needed water supply.



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The installation of blow-off valves on various hydrants can minimize water supply and adverse pressure effects during cleaning, repairs, or painting of the tanks. Such devices may satisfy the situation during the period of the inspection, if only a few hours are required. But to have a tower offline for several weeks would result in excessive and unnecessary water loss.

To reduce the high water loss some systems have installed variable frequency drives (VFDs) on water pumps. VFDs allow the pumps to pump different flow rates as necessary to supply the needed amount of water to maintain adequate supply and relatively constant water pressure.

Several years ago, KRWA designed and had a portable 4,000-gallon pressure tank constructed. It becomes a pneumatic pressure tank when air pressure is applied in the tank. A local contractor constructed the tank that is mounted on a tandem axel trailer and has support jacks on all corners when in use. It is coated with NSF-approved paint. The tank can easily be pulled from system to system with a half or three-quarter ton pickup. Currently

KRWA is in the process of obtaining a second, similiar “emergency water supply” tank. One tank will perform adequately for a small system. Having two tanks will allow KRWA to help some of the larger cities and rural water districts. Some tank maintenance service companies may also have tanks available for rent.

**Don't forget to clean clearwells**

Many water systems also have water storage clearwells, as do all surface treatment plants. These clearwells, above or below ground, should be inspected at least every two years. Unfortunately, many clearwells are overlooked.

I have worked with many systems across Kansas over the years, helping them clean and disinfect their clearwells. There usually is some sediment in the clearwells that may contribute to high turbidity and also require a chlorine demand. Some turbidity from clearwells can end up in the water storage tank and in the distribution system.

For cleaning, in most incidents, the clearwell is pumped to a water level

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4"- 16"
- VALVE TURNING**



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**I encourage you also to check out the various tank maintenance companies that will be at the 2015 Annual Conference & Exhibition, March 24 – 26 at the Century II Convention Center in Wichita.**

with the high service pumps and then the remaining water and settlement is removed with a small, portable pump. It's important to ensure that there is adequate ventilation and that the air quality is monitored as the clearwell is a confined space. With a little hard work, squeegees, brooms, and disinfectant it shouldn't take long to get a clearwell completely cleaned and disinfected. The cleaning process also

gives those doing the work the opportunity to check for cracks in the foundations and check the vents to make sure they are screened properly.

Preventive maintenance on water storage tanks is one key to a safe, good water supply. There are steel water storage tanks in Kansas that are more than 100 years old and there is no reason those tanks should not be able to provide service for many more years. Proper painting and periodic inspection every two or three years will ensure that tanks last for many, many decades.

A water storage tank is one of the most valuable assets of a public water system. It's not just a place to paint the high school mascot or to attach a cell or Internet antenna. Water storage tanks are the giants in many water systems.

KRWA staff are available to discuss any questions anyone may have concerning tank maintenance; KRWA staff can also assist with inspections of tanks. And if a situation requires that a storage tank be taken offline for an extended period, KRWA staff are very

experienced in providing options, and the equipment, to control the wasting of water and still keep the system in satisfactory operation.

I encourage you also to check out the various tank maintenance companies that will be at the 2015 Annual Conference & Exhibition, March 24 – 26 at the Century II Convention Center in Wichita. Shop around and gain information to make informed decisions about tank maintenance or any other aspect of water and wastewater utility operation and management. I think you'll be glad you made the investment of attending the conference because of the information that can be gained.

*Lonnie Boller is a Technical Assistant at KRWA. He has been employed by KRWA since 2001. Lonnie is a Class II certified operator; he previously was Water Plant Supervisor for the City of Horton. He has also attended and completed training at the University of Kansas Law Enforcement Training Center.*



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