Water Tank Leaks and Freeze-Ups: *Understanding the Reasons Behind Them*

There are many different circumstances that can cause water tanks to leak: deterioration and corrosion, harsh weather, age, even vandalism. Corrosion deteriorates the structural integrity of the tank. Over time, the steel rusts as it encounters a mixture of air and water while the exterior is exposed to precipitation and sweating from condensation. In North Dakota, we are blessed with four unique seasons. Leaks most often occur during cold winter months. As your water tank ages, the chance of it failing increases. On a positive note, there are several preventative maintenance measures you can complete to extend the useful life of the tank. Systems should conduct routine security self-assessments to make sure the water system assets are protected against manmade threats.

Water tanks often freeze for several reasons. Most commonly, this is due to extended cold periods, severe winter storms or the loss of electricity for circulation of the tank. Another frequent cause is not fluctuating the water level in the tank. Unfortunately, many operators do not realize the problem until it is too late. If ice forms on the lakes or ponds in the community, there is a good chance there is a cap of ice inside the storage tanks. Consider these preventative options to stay ahead of ice formation:

- **Reduce the water level** before cold weather hits. A lower water level prevents overflow and protects against damage caused by expansion and also increases fluctuations in water levels.
- **Install a mixing system** to keep water circulating and to prevent static conditions. The turnover will also break up any surface ice that has formed.
- **Regularly inspect tanks** for possible damage or leaks. Even a small trickle of water can lead to excessive ice buildup, causing structural damage.
- **Utilize deep cycling methods** to continually refresh the tank with warmer water from the treatment plant.
- **Remember, moving water does not freeze.**

Some tanks are over 100 years old and are still in service due to a good preventative maintenance program. A solid understanding of what it takes to keep them functioning will reduce the risk of tank failure. Proper coating maintenance, on a routine schedule, will ensure the longevity of the tank.

System operators should do thorough visual checks on a quarterly basis. They should inspect the exterior to determine if there are signs of damage or weakening of the structure and coatings. Also, having a user-maintenance agreement with a professional tank contractor is beneficial. Inspect the exterior and interior of the tank by utilizing a closed-circuit television (CCTV) method, or having a diver go inside the tank to determine if there is an issue on the interior of the tank. Periodically, have the interior re-epoxied and give the exterior a fresh coat of paint. If a leak or damage is detected, using the services of a tank repair professional is highly recommended.

With the use of an asset management program, budget and diligent planning, water department staff and elected officials can ensure the longevity of one of their largest investments.

The next time you think about your tank, take a moment to assess it. Due diligence could help prevent a potential catastrophe. If you need help understanding the ins-and-outs of your tank or would like a better understanding of its function and purpose, please contact North Dakota Rural Water Systems Association at 701-258-9249 to assist you with finding solutions to your water system issues.