By Jeff Lamfers, KRWA Consultant

Is Your Water System Ready for the Next KDHE Public Water Supply Sanitary Survey?

Flushing of the distribution system is a good practice annually.

The purpose of this article is to educate water supply operators on what KDHE staff looks for during the sanitary surveys the agency conducts. I know during several past KRWA workshops, we have asked KDHE District Office staff to give a brief presentation on what a sanitary survey entails. In this article, I hope to expand on the response and alert operators about some of the more common problems found during a typical survey. Hopefully by providing such information to operators in advance of any survey, attention can be given to those issues and/or problems that could be potential deficiencies and action taken to correct them. It might even be a good idea if the water system conducted its own survey every year or two, looking for problems that could potentially affect the quality and quantity of water delivered to customers. Obviously, the goal of any self-inspections and especially KDHE sanitary surveys is to ensure each water system is operated efficiency, satisfactorily and in compliance with all applicable regulations.

In order to write this article, I contacted KDHE District Office staff in all six districts asking for their help in identifying common problems found while conducting surveys. And while the responses varied somewhat between districts, there were several common problems recurring across the state. I can also comment that as a former employee in the KDHE Lawrence District Office for more than 30 years, many of the deficiencies found today are the same as those found as far back

KDHE requires that all chlorine gas cylinders be restrained with a chain, whether empty or full. Note this cylinder is not restrained.

The photo shows a chlorine gas cylinder with proper chain restraint and wrenches on shut-off valves.

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as the mid-1970's. I think it is safe to say that some deficiencies will always be a problem for some systems. This should implore the operators of those systems to be diligent in finding and correcting recurring problems. After all, that is a major responsibility of operating staff. As is the case with most public water supplies, boards, councils, and commissions rely heavily on their operators to make them aware of treatment and distribution system problems so they can be resolved.

The broad areas reviewed during sanitary surveys include inspecting all sources, treatment, distribution system including finished water storage, security, management and operation, and compliance with operator certification regulations. Most of these areas are easily understood. However, some of the basic items reviewed include:

- Source review includes checking whether contamination sources are present (wells or surface water intakes), maintenance, pump lubrication, metering, condition of valves and piping, and whether raw and finished sample taps are available. Inspectors also check to confirm emergency standby power is available and routinely tested.
- Treatment review includes the condition of all finished water clearwells, condition and effectiveness of filters and runtimes, backwash criteria and disposal of backwash water, type disinfection used, condition of any clarifiers in use and chemical feed rates (including storage and safety procedures). If using gas chlorine to disinfect, the review will consider if adequate heating is provided in the chlorination room, whether scales are available for monitoring pounds of chlorine used and whether gas cylinders are adequately restrained. Inspectors also want assurance the system has a backup, spare chlorinator.
- Finished water storage review includes type, capacity and condition of storage tanks, whether vents are properly screened, overflow pipes screened and entry hatches secured. KDHE recommends that all storage facilities be inspected every three to five years.
- Under "Management and Operation", the inspector looks at items such as preparing and posting your Consumer Confidence Report each year, whether past survey deficiencies are still resolved and equipment records, including routine maintenance provided. Also included are reviews of the system's Emergency Water Supply Plan (required by K.A.R. 28-15-18 c) and Water Conservation Plan. Systems are expected to update their Emergency Water Supply Plan yearly.

Of all the deficiencies noted by KDHE staff, the most common is water systems not monitoring chlorine residuals daily as required by K.A.R. 28-15-19(b)(2). This regulation requires

Note this well is very well maintained with screened well vent and drawdown gauge. Also note the crack in the concrete slab that has been repaired with grout to prevent the entrance of contaminants.

that all water supplied to the public from a public water supply must be disinfected. It further requires that if chlorination is used, residuals must be monitored daily and recorded in a manner that can be reviewed by KDHE staff. Daily means weekends and holidays, in addition to weekdays. And this applies to all water systems, even those that purchase their water. Over the years, I have heard many operators of purchasing systems question why they must monitor chlorine residual since they don't treat the water. True, you may not treat the water. But residuals can

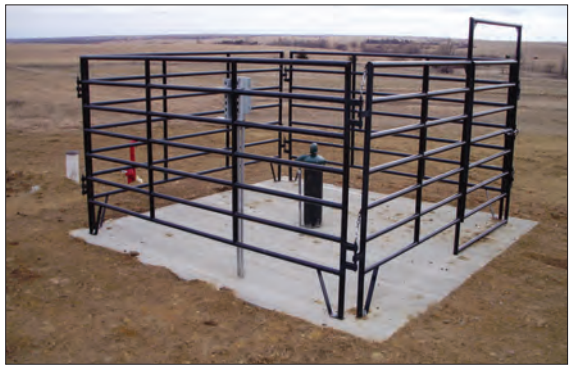
Lack of plans, and other frequent problems

Another common deficiency is the lack of plans and/or the updating of those plans yearly. Plans either required or suggested by KDHE include:

- Bacteriological Sample Siting Plans
- Stage 2 Disinfection Byproducts Rule Monitoring Plans
- Lead and Copper Monitoring Plans
- Emergency Water Supply Plans
- Cross-Connection Control Program including a KDHE-approved ordinance or bylaw (required by K.A.R. 28-15-18 (f))
- Water Conservation Plans (required if a water system ever applies for funding through USDA or KDHE)
- Water Drought Contingency Plans plus ordinance (city) or resolution (RWD) adopting your plan (usually part of Water Conservation Plans)

Additional frequent problems noted by KDHE District Office staff include:

- Poor maintenance of storage facilities including not conducting periodic inspections and keeping vents and overflow pipes properly screened
- While hopefully not a frequent problem, dead birds in storage facilities due to open hatches, vents and pipes
- The presence of mice and mouse droppings in well houses
- Lack of backup, emergency power to operate wells, water plant, etc.
- Not routinely testing emergency generator under load to ensure it will satisfactorily provide power during an emergency
- Lack of a backup operator. The individual designated as the backup operator does not have to be certified, as long as they are trained and under the supervision of a certified operator
- Not conducting periodic, systematic flushing of distribution system;
- Lack of properly-sized screens on well vents (16-mesh, non-corrodible)
- Unsatisfactory storage of chemicals and/or storage of incompatible chemicals adjacent to each other without proper containment
- Not meeting records retention requirements. As a simple rule, KDHE recommends maintaining all records for a minimum ten (10) years with the exception of records of lead and copper monitoring which must be maintained a minimum twelve (12) years
- Not keeping electronic records backed up on several computers or external hard drives
- Rusted valves and piping in well houses and not providing a dehumidifier to reduce sweating of pipes
- Allowing livestock too close to wells, which could result in damage to wellheads unless adequately protected; there can be no pollution sources within 100 feet of a public water well.

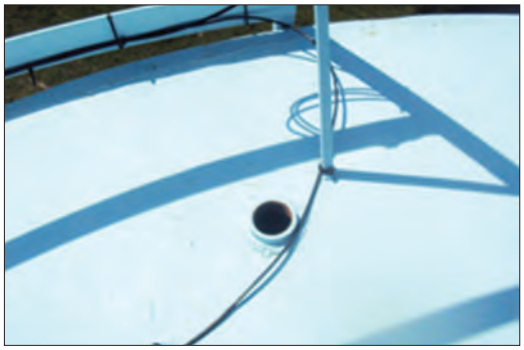


This well is located in a pasture where cattle are nearby. Corral panels were provided to keep cattle away and prevent any damage to the well.

dissipate over time out in your distribution system and I doubt the contract with your wholesale supplier requires them to maintain adequate residuals to the far ends of your system. Some purchasing systems have even had to install equipment to re-chlorinate so adequate residuals can be maintained to the far ends of their system. Whether the system purchases or not is irrelevant when monitoring and maintaining adequate residuals in the distribution system.

So monitoring is crucial to ensure the final requirement of this regulation is met: namely, that a sufficient amount of chlorine must be added to maintain distribution system residuals of at least 0.2 mg/L free or 1.0 mg/L combined chlorine. Both KRWA and KDHE staff realize maintaining combined residuals can be a challenge for those systems that purchase surface water with combined chlorine, especially during summer months during periods of high water temperatures. But regardless, residuals must be monitored daily by all public water supplies to determine if there are problems meeting minimum residuals and where those problem areas are located.

I should also mention that K.A.R. 28-15-19(b)(2) requires that residuals be monitored daily so that KDHE "can determine whether the requirements of this rule and regulation have been met." **My interpretation of this regulation means that daily residuals at one location that specific day may not be sufficient.** In short, this could require taking residuals at several different locations each day. I am not sure this issue is brought up by KDHE staff during their surveys. But residuals should be used as a tool to find problem locations. After all, operators should be concerned about the bacteriological quality of water delivered to their customers.



Notice the opening on top of standpipe. This opening allowed birds to enter the standpipe, but they could not escape. They eventually died, contaminating the water within the standpipe.

This is the overflow line on an elevated storage tank. Note the flapper-gate at the end of the overflow to prevent the entrance of vectors. A splash pad has also been provided to prevent erosion problems.

Unfortunately, I have had operators tell me they check residuals in areas of the distribution system where they know residuals will be adequate! Wrong! That most definitely is not the intent of K.A.R. 28-15-19.

One final common problem is not having a valve exercise program. In the past, this was simply a "Recommendation" in KDHE's inspection report sent to the water supply after the survey. But recently it has been elevated to a "Minor Deficiency." When I first heard this, I thought KDHE might be over-reacting. But once the logic behind making a valve exercise program a deficiency was explained to me, it made more sense. According to KDHE, there are far too many boil water advisories issued due to water leaks causing a system-wide loss of pressure due to either valves that do not work or cannot be located. And I concur. Most leaks should be easily isolated to several blocks in town or a few miles in the case of rural water districts, assuming the leaks are found quickly. But I know from experience, that in many small towns a small water leak results in the entire town being without water. I have even heard operators tell me they immediately shut off their elevated storage tank to save that water, meanwhile the distribution system is totally drained. Losing all pressure presents several problems including customers being inconvenienced. More importantly, it increases the likelihood of back-siphonage due to cross-connections. Having a valve exercise program just makes sense. And KRWA staff are available to help systems develop such a program.

Last but not least, should KDHE inspectors cite your system for having either a Minor or Major Deficiency, your system has 30 days in which to either correct the deficiency or respond with a timetable explaining how the system plans to resolve said deficiency. Depending on the deficiency, KDHE staff is usually easy to work with to resolve any problems.

Finally, I would like to thank those KDHE District Office staff who provided me with invaluable information in writing this article. I again encourage all systems to conduct their own sanitary surveys in the near future to see if you find any problems that might be considered deficiencies. And if you find deficiencies and want recommendations on how to correct them, I suggest contacting your KDHE office. I am also available to provide assistance if needed. Please feel free to contact me at 913-850-8822 or jeff@krwa.net.

Jeff Lamfers began work for KRWA in November 2008. Jeff has more than thirty years of regulatory experience in the oversight and operation of water and wastewater systems with the Kansas Department of Health and Environment. He is a graduate of the University of Kansas with a degree in Environmental Studies with an emphasis in aquatic biology.