

Wastewater systems require basic maintenance

Out of sight, out of mind! Too often that's the attitude that some people may have when it comes to considering or providing maintenance of their wastewater utility. I hope by explaining a situation that KRWA recently worked with, readers will have a greater appreciation that wastewater systems require basic maintenance.

The case involves a city whose operator had just quit to accept employment in another system. The city clerk called KRWA for help. My first stop was at city hall. I met with the city clerk, also

recently employed by the city and a member of the city council. I soon concluded that no one had any idea of the maintenance needs of their wastewater utility system. But these folks

wanted to learn and they wanted to improve.

Starting with the lagoon

After introductions and background information about the system were exchanged at city hall, our first stop was the wastewater lagoon system. Arriving at the lagoon site, I saw weeds nearly five feet tall (see photo 1.) This isn't the correct way to maintain a lagoon system. All this vegetation will allow vermin to burrow into the cell walls. The burrows can weaken the dikes. The weeds also block

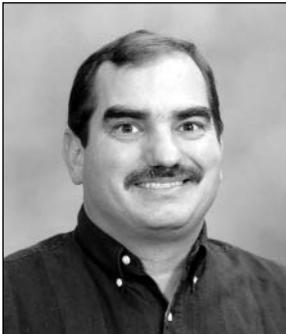


Photo 1. KRWA's Wastewater Tech Charlie Schwindamann stands in some high weeds near a lagoon. (see pipe around influent structure in background). The operation of a lagoon system can be affected when weeds and brush are allowed to get out of control. The tall weeds restrict wind from blowing across the cells. Wind causes ripples that add oxygen and help with the treatment of the waste.



Photo 2. Vegetation around the effluent structure shows that no one has given a careful inspection to the system for quite a while. These bushes had to be pushed back to view the effluent (discharge) structure of the system. This cell was operating at least 18 inches deeper than the discharge gate. With proper operations this situation could be avoided, as it would have been discovered by the operator who should then have taken corrective measures. Operators should check lagoon systems at least three times weekly, including an inspection of each structure. The pipe to the structure could be partially plugged or extreme inflow and infiltration (I&I) may have caused a high water level. This system was discharging a small amount at the time the picture was taken.

Charlie
Schwindamann
Wastewater Tech



wind, reducing the natural rippling or wave action that adds critical oxygen for the treatment process. That oxygen is essential for proper treatment of wastewater to occur. Wastewater lagoon dikes do not need to be 'house yard perfect' but the grass or weeds need to be mowed before the growth reaches knee high.

Next, we checked the effluent structure. It was covered with vegetation (see *photo 2.*) It appears that no one had inspected the effluent for quite some time. Such inspections should be part of the daily round of duties for a wastewater utility operator. Operators need to walk around the lagoon to check for any problems that may have occurred and then correct the problems. After tugging our way through the vines around the effluent structure, we found that the effluent pipe was partially plugged. Flow was going over the weir. This was evident by the level of the cell being about 18 inches higher than the weir in the effluent structure (see *photo 3.*) The wastewater was within inches of flowing over the top of the effluent structure, directly to discharge.

I documented these problems to the city while on-site as well as in a follow-up report. The city had a contractor clean the lines. The operating level was lowered to an acceptable level of about five feet (see *photo 4.*)

Plywood and wastewater do not mix

Next, we checked the influent structure. To our surprise, we found pieces of plywood and lumber in it. I believe this material was remnants of some homespun engineering attempt to control the direction of flow in the two-cell system (see *photo 5.*) In a lagoon system, lumber rots and can result in a blockage of the influent pipes which then results in "short-circuiting." A

city council member who does welding provided a "V-notch" weir to direct the flow to the right cell. That corrected this problem (see *photo 6.*) The weir

short-circuiting problem on my first visit. During my follow-up to the system several weeks later, I found the influent line to the primary cell was plugged!



Photo 3. A lagoon system with the depth of the cells operating at over 18 inches is too deep.

was designed based on plans the city had of the system. Because of the extreme depth at which both cells were operating, we did not determine the extent of any

The flow was going directly to the discharge cell (*photo 7.*) I helped clean the line the next day. Since then, the system has been operating properly. Short-

**CUNNINGHAM SANDBLASTING
&
PAINTING COMPANY, INC.**

4300 West 32nd Street Joplin, Missouri 64804

417-626-2800

Total Capability and Quality Workmanship

**43 YEARS OF ACTUAL EXPERIENCE BONDED
24-HOUR EMERGENCY SERVICE INSURED**

**INSPECTIONS AVAILABLE
COMPLETE WATER TANK MAINTENANCE PROGRAM
POWER WASHING AVAILABLE TO 3,000 P.S.I.**

CERTIFIED IN DELEADING OF INDUSTRIAL STRUCTURES

Experienced in all phases of cleaning, painting and repairing of water treatment plants, concrete reservoirs, swimming pools, ground storage, standpipes and elevated water towers.

*Membership
Kansas, Missouri, Arkansas, and Oklahoma Rural Water Associations*



**PROTECTIVE
COATINGS APPLIED**

Hi-Build Epoxies
Urethanes, Industrial
Enamels, Etc.

**Sherwin Williams,
Tnemec, Ameron**

circuiting in a lagoon system can cause the utility to fail to meet the discharge permit requirements. That can result in possible fines and increased testing frequency from quarterly to monthly. Additional tests translate to more expense.

I have since made additional contacts with the new operator and visits to the town to assist

him with the basic operations and maintenance of the wastewater system. We reviewed the problems that we found earlier and the steps that were taken to correct them. Basic operation of the system was explained. As a result, the operator has a much better understanding of potential problems and how to detect them. While I was at the city in early

September, the operator asked if I would check a lift station and provide suggestions for maintenance. How timely! We found a separation in the plastic pipe inside the station. The result was circulation in the station and none of the wastewater being pumped out. We checked a nearby manhole; wastewater was already backed up to that location. We went to city hall and contacted a local area contractor to pump the lift station down so we could repair it. Luckily, no sewage had yet backed up into any homes.

When the lift station was pumped down we discovered that the pump had a three-inch discharge and it had been reduced to two-inch so that a check valve and shut off valve could be installed. Then the piping was increased back to three-inch to another check valve; that valve was not functioning. We repaired the components to make the station operational. When the three-inch parts are on hand, we'll complete the repair in a proper manner.

I know that this experience may seem routine, however, it's just one example of where on-site help solves problems. Equally as important, the operator is better trained in the operation and maintenance of the wastewater utility. It's an example of how providing routine maintenance should not be considered "routine." With my follow-up reports going to city hall, other council members should also be aware of what problems were identified and how they were corrected. The underlying point is that it is critical to ensure that the city's utilities receive necessary maintenance.

Big crowd coming

Here's what's not so routine about this situation. The assistance KRWA provided to this wastewater utility was at



Photo 4. This photo show cells that are operating at the proper depth after the effluent pipe was cleaned. The cleaning allowed the system to operate at the recommended five feet of depth.



Photo 5. This is plywood and other lumber in the influent structure of a lagoon system. These pieces can block or possibly plug pipes, resulting in short circuiting where the flow moves directly to the next cell. This lagoon system was short-circuiting as the inlet pipe to the primary cell of the two-cell system was plugged and flow was entering the second (final) cell, then discharging through the effluent structure, likely without the required detention time of 120 days.



Photo 6. The new "V-notch" wier directs the flow to the right cell, correcting the short-circuiting problem.



Photo 7. The flow is going directly into the final cell. This is commonly known as "short-circuiting". This line was cleaned the day after the problem was discovered; the system is now functioning properly. A local welder who is also a member of that city's council is replacing the rusted gates. This city contacted KRWA for assistance on its wastewater system after the operator quit. KRWA assisted with the lagoon system as well as the water treatment facility.

10 a.m. on Friday, September 3. We worked through lunch and finished at about 3 p.m. This town has a large Labor Day celebration that attracts hundreds of people beyond their regular population. Identifying these problems and getting the repairs made came at a pretty critical time.

KRWA's wastewater program provides invaluable service and training to hundreds of communities each year. If you have questions about your system or if you have technical issues ranging from smoke testing to measuring sludge in lagoons, give KRWA a call at 785/336-3760.

Got LayneOx™?



Exceptional
Hi-Rate Catalytic
Filter Media
for treatment of

- Arsenic
- Manganese
- Iron
- Hydrogen Sulfide
- Radium/Uranium

For LayneOx™ and Other
Water Treatment Technologies
Contact Layne Christensen Company

913-321-5000

rrappard@laynechristensen.com



Layne Christensen Company
Water Resource Division
www.laynewtd.com