

Lift stations – the ‘other’ pumps, require regular maintenance

Wastewater lift stations are used to help transport liquid wastewater from homes and businesses across the wastewater utility to the treatment plant for processing. While most of the readers of *The Kansas Lifeline* are water system operators, there are more than 2,000 wastewater operators in the state and so I'll refer to the lift stations as “the other pumps.”

When and where are lift stations installed? The best description for this is one I recently read in the manual, “The Operation and Maintenance of Wastewater Collection Systems,” Vol. I, published by California State University, Sacramento. It reads, “Lift stations are used in gravity collection systems to lift (pump)

wastewater to a higher elevation when the slope of the route followed by a gravity sewer would cause the gravity sewer to be laid at an insufficient slope or impractical depth.”

The most important thing to remember about lift stations is that they require regular, routine maintenance. Regular maintenance means daily – or at least a minimum of three times per week. Maintain a record of what is done. Log the hour/flow readings and rainfall amounts. Note if someone greased the motors or cleaned the floats. Also if there is a backup generator for the station, note the times it was tested. Alarms

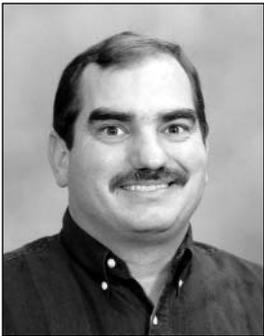
also need to be checked to make sure they are also operating. Good records can assist a system if a bypass or backup occurs and records are needed to prove that the

when trying to determine the extent of inflow and infiltration to the system. Flow measurements can assist in determining if there are problems with a pump. An example

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utility has been responsible – or if managers have been negligent. The records can prove that a problem was not an ordinary event and that it was no fault of the operator. Is there a rain gauge available to even record the amount of rainfall? This basic information can be invaluable

will be if pump #1 normally runs one hour per day then it starts to slowly increase in hours over several weeks. This may indicate a partial blockage. If the increase in runtime occurs all at once, say overnight, there may be a complete blockage or may be a mechanical



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Mayer Specialty Services, LLC, Goddard, Kan., instructed at a seminar entitled "Manhole Rehabilitation and Cured in Place Pipe Lining," held at Marysville, Kan. on May 5, 2006. Here the group watches as Mayer's crew sets up to begin work on a manhole.

or electrical problem. Operators need to “know their system.”

Check the sensors

When inspecting the stations, make sure the sensors to turn on the pumps are working properly.



Left: A chain type cutter gets the attention of the attendees at the wastewater training seminar held at Marysville's City Hall on May 5.

Below: Steve Williams of Key Equipment and Supply Company, Kansas City, Kan., provides instruction on safe operation and maintenance of different types of sewer cleaning machines at the session in Marysville.

These include floats, bubblers, vacuum pumps and transducers. Floats can accumulate grease and soap; they should be cleaned regularly. Bubbler systems can develop holes in the tubing; the result is that pressure is not allowed to build to turn on the pumps through the pressure switch. Vacuum prime type systems have problems with debris getting into the solenoid valves and also, as with the bubbler, pumps can fail. There are many other problems that can occur with lift stations, but these are a few of the more common that operators experience. I suggest keeping parts on hand or know where an operator can get them within an hour. That may be from a neighboring community or a supplier. Remember, problems occur on weekends and the parts need to be available.

Every lift station should have at least two pumps and some may have three. This is a requirement

of KDHE. It is not some manipulation to force a utility to purchase additional pumps. As mentioned before, if a problem occurs and there are no parts, a second pump may allow you to get by a day or so. I am most

concerned about systems I have visited that are operating on one pump, not knowing that the other has been removed. These situations are just disasters in the making. That's another reason why hour meters should be installed for each pump. If the hour meter fails, it needs to be replaced as well.

Safety is paramount

The biggest hazard with lift stations is the safety. Wet well type lift stations are probably the safest since entering the wet well is not necessary for an operator to address most problems. The worst

safety hazard, in my opinion, is the dry well type. These have the pumps in a supposedly dry structure and are in confined spaces. Most small wastewater utilities do not have the proper equipment or enough personnel to enter confined spaces. Many operators still climb down into these stations to do the daily or weekly checks. I believe part of KDHE's regulations on lift stations should include that if a system can't prove to have the proper confined space equipment and enough trained personnel that dry well lift stations should not be allowed, even for replacements. Most councils and boards are not aware of the dangers associated with working with wastewater and in confined spaces.

Replacements

For utilities that are considering replacing or adding a lift station, I suggest finding out what neighboring communities have for lift stations and problems they may have experienced. Also, try to keep lift stations uniform by



manufacturer or type for ease of operation, maintenance and parts inventory. The contact person or company should be on hand and noted in a systems Emergency Operating Plan (EOP). Yes even

wastewater systems should have an EOP. The EOP should be updated at least on an annual basis.

Degreasers

One of the questions most frequently asked by wastewater operators is what my opinion is concerning the best degreaser. The only way to answer that is to say that it depends on your system as to what the wastewater contains. For example, if the collection system is composed of all residential customers, then you will not need a degreaser with the potency that a system that services many restaurants would need. Another important point is that operators need to know for sure if the material is really grease or is it soap?

My suggestion is to discuss any questions with a chemical supplier. Have them inspect the lift stations to determine the extent of grease in the system. Also, when a degreaser is chosen, get a performance contract from the supplier.

Performance contract?

A performance contract on chemical addition for degreasing would relieve the utility from paying for a product that did not perform. Again here is where good records are important. Suppose the instructions for the chemical suggest using it daily for a week (make sure a week means five days or seven days), and then twice a week after the initial dose. Make sure your records verify that the chemical was added at the recommended amounts in the suggested timeframe. The chemicals can be very expensive and you should determine how much the system needs for a year to determine if it is financially feasible to use them.

Sanitary Sewer Lift Station Maintenance Tips

Performance of routine and preventative maintenance can save the onsite lift station owner from costly repair bills. These suggestions were gathered from several utilities' maintenance guidelines. These suggestions are intended to help ensure fewer breakdowns and problems:

1. Wet wells should be pumped out and cleaned at least twice a year, or more often if necessary, to prevent solids and grease build-up. Build-up of solids can create odors and damage the pump.
2. Inspection of submersible pumps should be performed quarterly. Inspection of the impeller should be performed quarterly or when motor hours are not within 10% of each other. The inspections would assure that the impeller is free of debris.
3. Inspection of the check valves should be performed at least twice a year to ensure proper working order and to prevent backflow from the force main to the wet well.
4. Cleaning and inspections of floats four times a year assure proper performance. The buildup of grease prevents floats from working properly.
5. Inspection of the light and alarm systems should be performed weekly. An alarm system in working order can alert an operator to problems immediately.
6. Installation of hour meters on each motor will give one an accurate record of how often each motor is cycling; and hence, the amount of water being pumped through the system. A logbook of motor hours, dates and maintenance performed should be kept.
7. Amp readings should be taken at least once a month on each motor in the on-site lift station. If the amp readings do not meet the manufacturer's specifications, it is an indication that debris is lodged in the propeller within the motor, or that water has entered the motor housing or the wiring.
8. A semi-annual inspection of all electrical motor control equipment to find poor connections and worn parts should be performed.