by Jon Steele

Summertime tune-up for valves and hydrants

After what seemed like a long and snowy winter, late spring freezes, water utility operators no doubt are now thinking about those forgotten or neglected mainline valves and hydrants. Of course everyone is, right? KRWA has assisted several communities in 2007 with flow testing of their hydrants.

There are times when I think it would be good for every operator who doesn't appreciate the suggestion to exercise valves at least annually to be required to work on everyone else's valves. A simple exercising program can turn into a "Nightmare on Elm Street" when the hydrant you are working on doesn't shut off and the gate valve that is supposed to be in front of it isn't there or it is corroded to the point that it will not function. By the same token, the operators in most small systems are required to attend to other work such as maintenance of streets, parks, the wastewater system, perhaps an electric system - all often by the same one or two people.

Jon Steele, Tech Assistant

Does your water system have a valve and hydrant maintenance program? I find most systems do not. Many cities have have allowed the valve risers to be covered with asphalt. Not only are the valves not operated, a metal detector has to be used to locate the riser. This is not a good situation on a frigid winter day when there is a major break. Valves need to be mapped and risers need to be clearly assessable. With age, waterline valves can lock; they corrode; they become inoperable. Without an annual exercising program, more deposits accumulate in them. Even with good quality water, mainline valves need to be exercised at least annually so that they will perform adequately in an emergency.

One system I recently worked with while flow testing a hydrant found that a newly replaced hydrant had almost no flow on it. After locating the valve, we found that the former operator had not ever opened the valve. This was discovered by the new operator's hydrant maintenance program. That town may as well not even had the hydrant. It was useless. Had there had been a fire and the fire department set up on that hydrant, just think about the precious time that would have been lost and possibly even personal injury occurred. The firemen would not have even had a clue where to find the valve since it was buried. To add insult to injury, the valve box was filled with dirt from a gopher; we had to clean that out before we could open it.

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Operate annually

As I mentioned, valves and hydrants should be operated at least annually. There are a variety of valve turning machines available or there is still the old faithful "Armstrong" machine that takes true grit to operate. Most machines now have a counter on them, which is a big help. A good rule of thumb to determine size or the number of revolutions required to open a valve is that there will be three turns per inch of diameter plus two turns at the end and plus three on larger valves. This is not an absolute rule but it holds true most of the time. One operator that I worked with in the past even built his own valve turning machine from a 12-volt electric wench motor; it works quite well. If you need to use a wrench on larger diameter valves, I recommend the hydraulic version valve wrench as those are much heavier duty and will last longer. The electric units will serve just fine on smaller systems.

Flow testing hydrants

Two hydrants must be used to properly flow test a distribution system. Valves can also be isolated to direct the flow different directions for specific studies and modeling. It's generally best to start at the source and work toward the outer ends of the system. A good hydrant identification system should also be established before a system begins the flow testing. Start by having the right equipment. A good flow tube with conversion charts, a hydrant cap with a good pressure gauge installed, hydrant wrenches, a couple of radios and notepads are all that is needed.

The pressure gauge will be set on what is known as the test hydrant upstream. Next, go one hydrant

Too often, valve risers are either covered by asphalt in city streets or not readily locatable in farm fields in some rural water districts.

downstream and install the flow tube device. This hydrant is referred to as the flow hydrant. Have the person on the test hydrant open it and check the static water pressure and record the results. Now the person on the flow hydrant should open the flow hydrant and record the pressure on the flow tube device with the hydrant fully opened. Convert the pressure to gpm from the chart. While the hydrant is flowing the person at the test hydrant should record the pressure on the gauge; this would be the residual flowing pressure. This will be the pressure the line has as residual with the flow hydrant flowing at a certain volume. This is valuable information to anyone interested in the hydraulic flow characteristics of the system.

Good records should be maintained for all hydrants and valves. Location, size and good drawings or mapping in relationship to the distribution system are critical to conducting water loss surveys or other work that may need to be performed. Hydrant records should include location, type, brand, outlet size, size of main, year installed, if it has a isolation valve size of shoe, depth of bury, date of last operation and the flow test results. Color-coding different flow rates is also a factor to consider. The drainback should also be checked every time you flow the hydrant. I have seen hydrants that the drain back was plugged with tree roots or mineral deposits. One hydrant I dug up that had no drain back ability had actually had concrete poured around it for restraint; the drain back was sealed with concrete.

I also like to lubricate the stem if needed and the threads on the cap. There are vendors who now have a food grade anti-seize that works great for the threads on the cap.

It's a thumper

One thing to watch for when operating hydrants is "play" in the stem. This causes a hydrant to "thump" on shut down. This can be a real problem since modern hydrants use pressure to assist with the shut down. This can result in water hammer. This is especially true on hydrants with high discharge rates. I call them thumper hydrants. Suppose that the worker is close to the end of the stroke. Suddenly the valve slams shut, creating a water hammer, resulting in shock waves down the pipeline. The result can be serious main breaks. I worked in a town once that had all new hydrants and every one of them operated in this manner. I called the factory representative and they were able to adjust them to prevent the problem.

That old Ludlow

An old brand of hydrant no longer made is Ludlow. Those were manufactured from the early 1900s to about 1940. These hydrants were prone to cause water hammer. After opening the hydrant, you could find that closing a Ludlow could be a challenge. They just don't want to close. They get really tight and you can break the stem; I have done that before. I found a trick that works good most of the time. Tap the stem as you turn it. When it tightens, tap on the stem with about a 4-pound hammer as you continue to close the valve. This will help the valve to fully close.

Most modern resilient wedge valves and hydrants will provide good service for decades if they receive a little care once in a while. Don't avoid hydrant and valve maintenance. You'll pay for it when you are least prepared to deal with the problems caused by the lack of attention.

If your city or RWD is interested in flow testing hydrants or if you want help establishing a valve maintenance program, give KRWA at call at 785/336-3760 or email to us at krwa@krwa.net.

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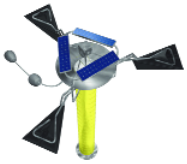

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