

Distribution System Flushing

Why Should We Bother ?

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Circuit Rider 1

The distribution system is a key element of every water utility. The importance of the water distribution system is quite obvious considering the fact that generally between 60 and 70 percent of the capital investment in a utility is allocated to the distribution of finished water. Dwindling capital resources, coupled with aging infrastructure, have placed enormous pressures on utilities to establish and maintain effective distribution system operation and maintenance programs. This was brought on, in part, by the Surface Water Treatment Rule which formalized the concept of a multiple barrier approach to microbial contaminant control, extending responsibility of the utility from the water source to the customers tap. As a result, utilities strive to produce cleaner drinking water. However, their customers are unlikely to see the benefits of this more sophisticated and costly treatment if utilities continue to deliver their product through old and neglected distribution systems that were never designed with water quality in mind.

A number of factors are increasing the work scope of today's water utilities: construction is on the rise, which requires additional time devoted to tie-ins; more regulations are being put in place (water quality testing, environmental controls, etc.); customer service demands continue to increase (there is an expectation of uninterrupted service, at all times); water systems continue to age, more breaks are

occurring, requiring immediate time and manpower be devoted to repair what is already in place. Water utility manpower levels are not growing. The combination of these factors, in most cases, leads the utility to spend much of its time and energy working on time critical "emergencies", which leaves precious little time for ongoing maintenance (that can prevent such emergencies in the first place). Wouldn't it be nice if we could only get this point across to our officials?

Well, lets get back to the reasons why flushing can be very important to the distribution system. Problems associated with water quality degradation are particularly acute with dead end or cul-de-sac lines and low demand portions of water distribution systems. Fire protection and land development codes often require oversized water mains, which compounds the problem. Cleaning and then routinely flushing a problem pipeline can help improve chlorine residuals levels and discourage the regrowth of bio-film. Water flushed regularly also achieves regulatory compliance related to coliform and heterotrophic plate counts (HPC).

In my opinion, the best approach to a successful flushing program is the implementation of a unidirectional flushing program. Unidirectional flushing (UDF), as opposed to conventional flushing, has proven to be one of the most powerful and cost effective tools that utilities have for improving and preserving water quality in the distribution system.

Some of the many benefits of UDF are:



- **Immediate water quality improvement through restoration of disinfectant residuals and removal of accumulated debris and biofilms**
- **UDF requires limited capital resources to develop and implement**
- **UDF reduces management involvement**
- **UDF allows for simultaneous preventive maintenance activities, such as valve and hydrant exercise**
- **UDF uses less water than conventional flushing**
- **UDF standardizes procedures which provide a uniform basis of comparison with future flushing events**

To be able to perform a true unidirectional flushing, you would have to have a complete hydraulic analysis of your system. If we all had this information available, we could start at our source and working our way to the end of the distribution system, taking care of dead ends and cul-de-sac lines as we pass them, and conduct a thorough flushing of the system. This approach lets us really open the hydrants to maximum velocity, cleaning the pipes without pulling contaminants from other lines as can happen with conventional flushing. But since most of us live in a world that doesn't give us this luxury, we will have to do the best we can.

Other benefits include:

- 1. Immediate improvement in water quality.**
- 2. Increased cl2 residuals. (less demand to fight biofilms flushed out)**
- 3. Helps systems meet increased regulatory requirements.**
- 4. Will eliminate customer complaints of dirty water.**
- 5. Can improve taste and odor by reducing bacteria counts.**
- 6. Will stabilize or improve your distribution systems c-factor.**

Ok lets all get out there and flush – flush- flush.

