

Subcommittee #1 -- Report and Recommendation on Water Loss

September 15, 2010

The Problem

In 2009, almost 220 million gallons of treated water was unaccounted for by the PAWSD. It is not known if this loss was the result of metering inaccuracies, leaking distribution pipes, unmetered deliveries to water users, or more likely, all three.

The loss of 30% of our treated water is a financial and public relations disaster for the District. How can we, in good conscience, ask our rate payers to make personal sacrifices to implement conservation practices, and approve major capital expenditures, to maintain a system that is wasting water on this huge scale?

The direct cost of treating water in 2009 as detailed in the 2010 budget was \$602,500. Considering that 30% of the water treated was lost or unaccounted for results in a potential direct monetary loss to the District of \$180,750. This does not consider the cost of the increase in size of all the related facilities; reservoirs, raw water pipelines, treatment plants, pumps, water tanks, and distribution network that is required to handle the water that is subsequently lost.

Finding a Solution

We propose a four-part approach to addressing the problem.

Part 1

There is available a portable meter available that consists of a band that is wrapped around the pipe, so that the pipe does not need to be cut to measure the water flow. This meter works on mains from 4 to 24 inches in diameter, and costs about \$4,000. We recommend that the District buy 2 of these meters to begin the program. First, we install them next to, in line with, existing meters in the treatment plants, and verify the accuracy of these meters. The treatment plant meters are the basis of all the water loss calculations. If the installed meters have consistent inaccuracies, they can be accounted for arithmetically in future calculations, or the meters could be sent out for repair or re-calibration. **This effort alone will be a major step forward at a small cost in equipment and labor, and will determine if the water losses are real losses or paper losses.** This effort can proceed in any weather.

Part 2

There exist in the distribution network today 7 sub networks where a pump fills a storage tank, and from the tank distribution pipes move water to a number of users. At the output of each of these pumps is a flow meter. It would be a simple and inexpensive exercise to read the pump meter at say noon Friday, read all the subscriber meters (all hooked to the firefly network), and read the level of water in the tank. Then we simply do it all again the following Friday at noon, and compare the arithmetic total of the pump output, the change in level in the tank, and the subscriber meter readings. If there is a discrepancy that is greater than the known meter errors, there is a leak or other unmetered use of water in that sub network that needs to be found and addressed. This effort can proceed in any weather.

Part 3

After the treatment plant meters have been verified, the portable meters can be taken to strategic places in the distribution network. For example, at both ends of a run of main where there are no tributaries (or, the tributaries have meters of their own). Then a simple comparison of the readings can be made, and if they don't add up, there is a leak or other loss in that section. By systematically moving the meters around, one can zero in on the exact location of the loss and then fix it.

As this effort proceeds, there will be times when we have to dig down to a main to attach a meter. We should be able to pick "easy" places to dig (i.e. not under the highway). The digging will increase the expense associated with the project, and it will also require good weather.

Part 4

In the future, when a main is exposed, either to be replaced or upgraded (for 30 psi to the lot line, or for fire flows) as already budgeted in the 2010 Capital Improvement Plan, we should make it a policy to install a fixed meter that is hooked to the firefly reporting network. Then it will be a simple matter to continuously monitor for leaks with automated software, and test sections of pipe when there has been a leak detected.

Conclusion

At the conclusion of the testing identified in Part 3, all significant losses will have been found and repaired, all the permanently installed meters will be calibrated and accurate, and the unaccounted water loss problem should be a thing of the past.

As we go into the future with Part 4, we should easily be able to do better than the national water utility average of 7% water loss (because we will have better than average monitoring capabilities), and that will amount to a substantial annual savings to the District and the rate payers, both in the direct costs and in the capital costs of securing, storing, and treating water we are not using.

We recommend that the District immediately embark on the above program. A great deal will be learned before any digging is done. The loss of 30% of our treated water is unacceptable.