Water Round Up

March 2008

Specialists in Recovery of Unaccounted-For Water and Lost Revenue

In This Issue

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The past couple of years we have been working at full speed with many water accountability and meter management projects. Our newsletter is a way to share what we have learned with our clients, friends and associates. Most recently we have successfully completed in-depth projects for the water utilities of Port Arthur, Laredo, Round Rock, Aransas Pass, Kilgore, South Houston, La Joya WSC, and Brownsville PUB. These projects not only determined the current levels of Unaccounted For Water Losses (Non Revenue Water-AWWA/IWA), but also provided detailed meter sizing and replacement cost analyses which will lead to significant revenue improvement for our clients.

We look forward to continuing to share our insight and experience with you through these newsletters. We would appreciate your feedback on any topic via e-mail to jbsmith@jbswater.com.

In this issue we discuss the pros and cons of small meter sizing and revenue impact.

Small Meter Selection

Many utilities do not have the in-house expertise for meter sizing and selection and therefore have relied on meter manufacturers or vendors to guide them in this process. This is especially true with regard to small meters. There has been a growing trend by some utilities to move away from 5/8x3/4-inch meters to 3/4x3/4-inch meters or in some cases, to one-inch meters for residential and small business customers. The move to larger size domestic meters may not be the best practice.

Currently most utilities are faced with the issues of water conservation, water accountability and maintaining revenue generation. Many of the decisions concerning meter selection and sizing have a direct impact on these issues. This is especially so with small meter size selection. The following table compares flow range capabilities of the two small meter sizes usually encountered in the U.S.

Meter Size	Range (GPM)	Max Continuous (GPM)
5/8x3/4	1/4 - 20	10-12
5/8x3/4 large chamber	1/4 - 25	15
3/4	3/4 - 30	15
3/4 large chamber	3/4 - 35	21

Water meter maximum continuous use is typically 50% to 60% of the instantaneous maximum rate of flow. In other words, a meter rated at 20 gpm would provide a continuous maximum rate of 10-12 gpm. In most homes, internal plumbing consists of

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The Problem:

Millions of Gallons of Non Revenue Water

Millions of Dollars Spent On Treating a Symptom Rather than Solving the Problem!

Not all Meter Replacement Programs are Cost Effective!

Not All Leak Detection Programs Are Successful!

JBS Offers Cost Effective, Long Term Solutions!

3/4-inch pipe or smaller. These piping conditions, along with tuberculation, increase head loss that may limit flow rates to 10-12 gpm, never approaching the meter's maximum design capacity (20 gpm). If sprinkler use is part of the customer's setup, then in some instances, usage may exceed the specified continuous maximum flow rate.

There are several factors that utilities need to consider when deciding which small meter size is best for the utility and the customer. First, metering solutions are *not universal*. There are many applications for many different types of metering endpoints. Second, potential meter life expectancy must be considered and there are several conditions that will impact meter life.

Small Meter Life Expectancy

When considering meter life expectancy, the first and perhaps most important condition is water quality. Water quality problems may be caused by the adverse effect of local water chemistry, which can lead to mineral buildup in the measuring chamber. Also, the presence of very fine sand or particles in the water can cause stoppage or increase measuring chamber wear. The second point to consider is the rates of flow at which water is consumed. Thirdly, meter age must be considered. Last, but not least, is meter quality. All of these factors will dictate actual meter life expectancy and long term meter accuracy.

Assuming good water quality and normal usage patterns, meter manufacturers have used a "suggested" number for small meter life expectancy of 1.5 million gallons. For the purpose of this discussion we will use that number as a benchmark. The key here are the actual usage patterns and flow rates at which water is consumed. It is very conceivable that under higher flow rates these meters can approach or exceed 5 million gallons and still provide acceptable accuracy.

A residential customer who consumes an average of 6,000 gallons per month or about 72,000 gallons per year would take about 20 years to reach 1.5 million gallons. Today, it is not realistic to assume that meters will last 20 years. On the other hand a small meter customer that averages 30,000 gallons per month would reach that benchmark in 4.2 years. Even with a 12 year life expectancy for this meter, total registration would approach 5 million gallons. *Clearly, meter age alone is not an effective criterion for meter replacement decisions*.

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Is a Meter Sizing Problem Resulting in Unrealized Revenue?

Are Old, Outdated or Mis-Applied Meters The Cause of Your Revenue or Water Loss?

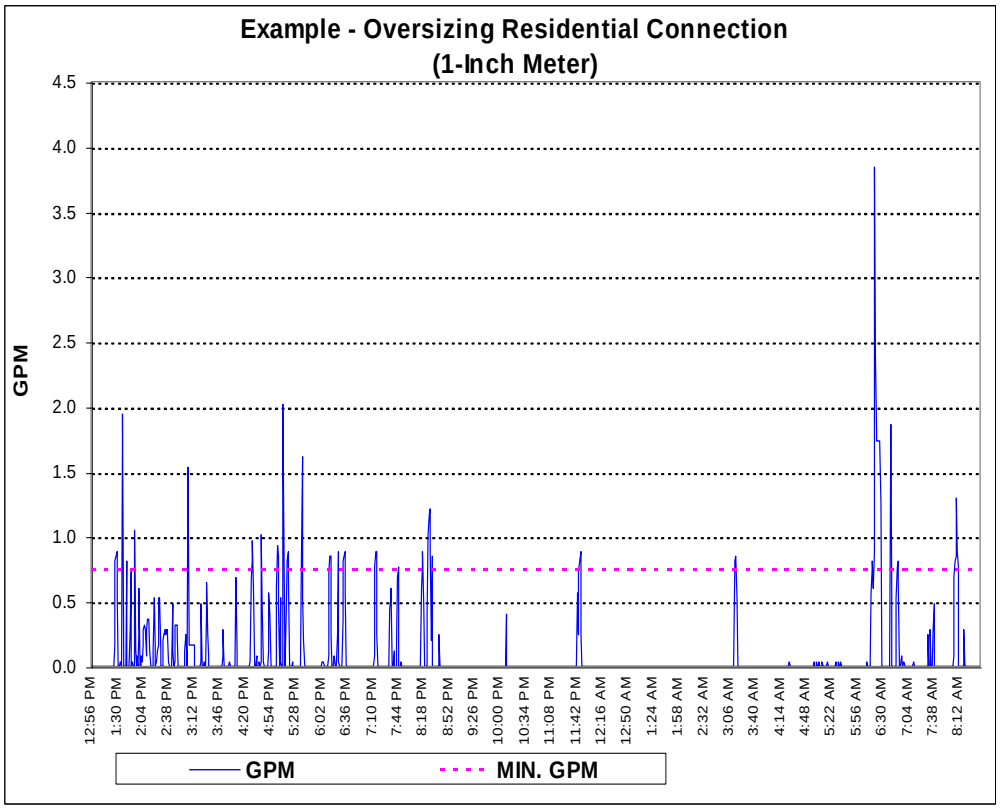
JBS Does Not Sell Products, or Participate in Revenue Sharing Programs.

We have nothing to gain from our recommendations, but their successful implementation by our clients.

Small Meter Sizing Considerations

When comparing 3/4-inch to 5/8-inch meters there are several factors to consider.

1. Theoretical life expectancy of a 3/4-inch meter over a 5/8-inch meter increases due to the increased measuring chamber size. However they are more expensive and lose accuracy at low flow (below 1/2 gpm) compared to a 5/8-inch meter.
2. The maximum design capacity of 5/8-inch meter is 20-25 gpm, depending on manufacturer. A 3/4-inch meter's capacity is 30-35 gpm.
3. Datalog results show that most water consumed in most homes takes place in a 2-4 hour time period each day. For example, a residential customer who consumes 10,000 gallons per month would have an average usage rate of less than 3 gpm (two hours total use each day). If the total daily usage period is longer, the average rate of use is lower. Even with a peak hour demand 2.5 times the 2 hour average, a 5/8 inch meter would suffice.
4. The following chart provides an example of an actual residential connection served with a 1-inch meter. This account should be serviced with a 5/8 inch account.



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Revenue Benefits of Proper Meter Selection

In the past few years we have had the opportunity to review consumption data on over 2 million water meters. We have observed the staggering impact on revenue of inappropriate application and sizing of meters. If not resolved, the consequences of these issues include:

1. Increased costs associated with meter replacement and maintenance.
2. The losses associated with meter error (Apparent Losses-AWWA/IWA), valued at the combined water and sewer commodity charge.
3. When meters are oversized, revenue is lost due to meter inaccuracies at low flows.
4. When flow rates exceed the design capacity of meters, extraordinary wear and tear is placed on the measuring chamber. This results in premature meter failure. When meter life expectancies are not realized, revenues are reduced and capital costs are increased.

Pictures of Canyonlands Bike Tour 2007

Every September Jim Smith takes a bicycle tour somewhere in the United States. In 2007 Jim participated in a 4 day tour of the Moab, Utah area, better known as Canyonlands. The four day bike trip toured the Arches National Monument, Dead Horse Point and Canyonlands National Park. As can be seen in the two photos, spectacular scenery, tough climbs for an "old guy" and incredible hikes in the various canyons. A beautiful part of America.