

November 5, 2003

Ms. Mary Cramer
Superintendent of Water
City of Rensselaer
505 Broadway
Rensselaer, NY 12144

Dear Mary,

Per your request, I have outlined some information regarding meter accuracy. Please review this information and contact me with any questions.

Accurate Measurement From Household Size Water Meters

A meter is installed in the water service line of a home to accurately measure the water being consumed. The accuracy of the meter is guaranteed by its manufacturer when it is purchased by the water utility. Limits on the accuracy are set by standards established for the water industry by the American Water Works Association. These standards assure the homeowner that all of the water that he/she uses will be accurately and fairly measured.

We know, however, that situations do arise in which the homeowner questions the accuracy of the water meter. This may occur when an old, worn meter is replaced by a new meter which more accurately measures water consumption. This higher accuracy level will result in a larger water bill for the homeowner. A leak in the homeowner's plumbing system or unusual usage of water may also result in an abnormally high water bill. In these situations, the homeowner often asks the utility whether his water meter could be running fast or over-registering.

It is widely accepted by the waterworks industry and the water meter manufacturers that meter accuracy will decrease with time, due to the mechanical nature of the products so the answer to this question is almost always "No". Under very rare circumstances, such as an improper register installed on the meter, the meter may "over register". The occurrence of this problem is very low, estimated at less than 1 in 100,000 meters installed.

A brief explanation of the construction and operation of a water meter will serve to verify the truth of this statement.

In a household type water meter, the motion of the measuring element, called a nutating disc or oscillating piston, is transmitted by a system of gearing to the register which records the flow in units of measurement such as gallons or cubic feet. The register

reading is thus dependent on the number of operations of the disc or piston. The reading is a true measure of usage only when the meter has been properly calibrated. For a new meter, this calibration takes place at the manufacturer's plant and is normally checked by the utility when it receives the meter. For a repaired meter, the utility checks the calibration by running an accuracy test on an accurately calibrated test stand in their meter shop. After proper calibration, the meter will continue to register accurately only so long as the disc or piston continues to make the correct number of cycles for each gallon or cubic foot of water passed through the meter. If any condition should develop whereby the disc or piston is compelled to make other than the required number of cycles per unit of volume, the meter reading will not be accurate.

Under ordinary working conditions, a number of factors may cause inaccurate registration, even after a comparatively short interval. However, in every case, these factors will cause the meter to under-register and in no case the meter be caused to over-register. Following are the more important of these factors:

Excessive Wear - Excessive wear of the moving parts of the meter may be caused by over speeding because the meter used is too small for the water demand in the home. The results of excessive wear of the measuring chamber are slippage and under-registration. Wear causes the clearances between the disc or piston and its housing to increase, allowing water to slip through unmetered. Excessive wear in the gear train may cause the gears to slip or to bind. In either case, if the meter does not stop entirely, under-registration will result.

Corrosion - All the metals used in the construction of the meter are affected by the corrosive action of water, although the action is very, very slow with most waters. Corrosion will cause excessive clearances to develop in the measuring element which will allow water to slip through unmetered, causing the meter to under-register.

Materials in Suspension - Foreign materials carried in suspension in the water have a tendency to fill the space between the piston and the measuring chamber thus affecting registration. All meters are provided with strainers which will retain the larger particles in suspension, but the strainer will soon become clogged if the water is not kept reasonably free from suspended matter. Sand is especially destructive and water utilities take extra care to keep sand from reaching the meter. Any suspended matter will cause a bind between the measuring element and its chamber causing it to slow down, which, once again, will result in under-registration of the meter.

Water utilities are well aware of the problems which can occur in their water meters. Maintenance plans are usually followed wherein the water utility will replace a household water meter on a predetermined schedule with one which has been calibrated for accurate measurement. The time interval between replacements should be based on local conditions and the amount of consumption. Normally this time period is between 10 and 15 years.