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## **Submetering of Water - a Growing Concern**

By: Steven Cook

The Weights and Measures Division has received several inquiries from industry and weights and measures officials regarding the submetering of water. Additionally, the State of Virginia wrote an article published in the Southern Weights and Measures Association July 2002 Newsletter, about billing for water without the use of a meter. These issues are of concern to weights and measures officials and are a source of consumer complaints.

Submetering is the practice of using meters; water, gas vapor, or electricity, to measure master metered utility consumption by individual users. A master meter, as used in the utility metering industry, is a utility meter typically owned, maintained, and read for billing purposes by the serving utility and supplies water (or other measured utility services) to multi-unit businesses and residences. Meters in these applications should not be confused with meters used as transfer standards. Submeters are installed at the individual units, residences or spaces in apartment complexes, mobile home parks (MHP), marinas, and short-term recreational vehicle parks that purchase water from a serving utility using a master meter. The owner of the complex, landlord, or a third party billing company resells the water and provides invoices to the residents or tenants.

Recent interest in water metering is due to water conservation issues increasing the cost of water service thereby providing the incentive for the use of submeters and non-metered water allocation charges for MHPs and multi-unit apartments. This has resulted in the installation of submeters and changes in billing practices. Additionally, local and regional rent control regulations, while limiting rent increases, may permit billing separately for utility costs when they previously were billed at a flat rate. Frequently, consumers who are billed separately for utilities use often (1) question the reason for certain water charges, (2) question the basis for calculating the charges, (3) complain they are being assessed improper, or illegal, charges for water service, (4) claim the water meters are inaccurate, or (5) claim the utility charges are another form of rent increase.

Water utility meters typically fall under the jurisdiction of a State's public utility commission or some other government municipality. Many of the State utility commissions have jurisdiction, in part, over submetered systems regarding the rates charged by the owner or landlord. Some jurisdictions may have a rule that landlords may charge the tenant no more than the amount that would be charged to a similar resident served directly by the utility. Additionally, some State public utility commissions and municipalities have no jurisdiction over the devices used in submetering, leaving compliance with performance and accuracy requirements to the state's weights and measures department.

In California, for example, the Public Utilities Commission's (CPUC) General Order 103 sets the standards for water meters and for meter reading applicable to CPUC-regulated water corporations up to and including the master meter. The standards for submeters at multi-unit apartments or MHPs fall within the province of the Division of Measurement Standards (DMS) within the California Department of Food and Agriculture (unless the meter is owned, serviced, and read by the serving utility or municipality).

MHPs and apartment owners may feel it would be a costly proposition to install separate submeters at existing locations (up to \$200 per unit) to recover increased water costs, and unmetered water usage promotes waste. This has led MHPs and apartment owners to use an alternative method to metered consumption to cover increased water costs. Landlords started using apartment square footage or number of tenants per unit as proxies for usage and imposed a separate water (and sometimes sewer) charge on that basis. These proxies are generally known as "RUBS," or Residential or Ratio Utility Billing Systems. MHP residents and apartment tenants have complained that the RUBS systems are flawed and do not accurately represent water usage. Tenants who make sincere efforts to conserve water pay the same as similar sized apartments with the same number of occupants who do not conserve water. Additionally, this method of representing water usage may be a violation of a State's method of sale law that requires that representations of water usage must be determined by measuring devices and not the use of alternate methods that infer actual consumption based upon a unit's number of occupants and/or square footage. As stated in the July 2002 SWMA newsletter, the State of Virginia Weights and Measures Law requires liquids to be sold by measure. The Virginia State Attorney General also stated tenants could not enter into contracts that circumvent the law.

Submeter installation problems have also been reported. Meters designed to standards other than NIST Handbook 44 have been installed as submeters. Some of the standards developed by the American Water Works Association (AWWA), such as AWWA C700-900 Cold Water Meters – Displacement Type, Bronze Main Case, are identical to Handbook 44 water meter tolerances. However, some AWWA standards for water meters, such as AWWA C712-02 Cold Water Meters – Single Jet Type, and AWWA C708-96 for Cold Water Meters – Multi-jet Type, have tolerances different than Handbook 44. The maximum and intermediate flow rate tolerances are the same (98.5 % to 101%) for the different types water meters. However, tolerances at the minimum flow rates differ. For example, displacement type meters have a minimum flow tolerance of 95% to 101% (equivalent to Handbook 44) where multi-jet meters have a minimum flow rate tolerance of 97% to 103% (AWWA C708-96). The tolerances in AWWA standards often vary on design and category of different water measurement technologies, whereas Handbook 44 contains water meter *performance* standards not dependent on a specific water meter technology.

Measuring devices have also been installed where no Handbook 44 requirements exist. Some apartment owners have installed separate hot water meters in an attempt to infer total water usage and energy costs for heating the water. Another type of meter is the small "point-of-use" water meter that can be installed on every water outlet in an apartment or mobile home. At the 87<sup>th</sup> NCWM Annual Meeting, Handbook 44 was

amended to recognize the size of these “point-of-use” meters and their remote meter reading capability.

The orientation of a submeter (or water meter) should also be a concern. The California DMS has noted and documented that the performance of water meters can be affected depending on the orientation of the meter. Testing by DMS has proven some types of water meters can perform within tolerance if they are installed in a horizontal and level position, but fail tolerances when tested in a vertical or out of level condition. Handbook 44 General Code paragraph G-UR.2.1. Installation states a “device installed at a fixed location shall be installed so that neither its operation nor its performance will be adversely affected by any characteristic of the foundation, supports, or any other detail of the installation.” AWWA standards do not address testing in a horizontal or any other position.

Weights and measures officials may receive consumer complaints because of the increased use of submeters and changes in water utility invoicing and may want to consider the following when investigating consumer complaints. Does the transaction fall under the jurisdiction of the local weights and measures department? If the answer is no, weights and measures can still help by providing the consumer with a contact name and number of the serving utility, municipality, water board or other agency with jurisdiction over the submeter installation. A local or State housing and community development department or mobile home owners associations may be able to provide assistance. State utility commissions may have laws requiring utilities to investigate consumer complaints and keep records of all complaints. Additionally, new tenants can be encouraged to review the rental agreement for an explanation of utility billing provisions.

In weights and measures jurisdictions that have authority over utility submeters, the official should obtain a copy of the invoice and accurately read the meter. Inaccurately reading the meter, either at the beginning or the end of the billing cycle, or incorrectly calculating the water usage or total price, are frequent reasons for consumer complaints of high water utility bills. All information used to calculate the invoice should be included on the invoice, posted by the complex management, or described in the tenant’s contract. The accuracy of the meter should be verified if the official determines the meter was read correctly and the consumer was invoiced accurately. Handbook 44 Water Meter Code Notes provide guidance to the official for the size of test drafts and water meter test procedures.

If you have additional information regarding water submetering in your jurisdiction, please contact Steve Cook by phone at (301) 975-4003 or by email at [steven.cook@nist.gov](mailto:steven.cook@nist.gov).