4.3 Industrial Sub metering

Applicability

This BMP is intended for industrial water users that do not already have submeters on all significant water uses. Submeters are an effective method to account for all water usage within a facility in order to determine the amount of water used in specific processes and lost to leakage and to identify water efficiency opportunities. Before deciding to adopt this BMP, the applicant may want to determine the relative flow volumes to be measured by using estimation methods to determine the potential cost-effectiveness of installing a particular submeter.

Description

Submeters are an effective method for measuring all major water uses including but not limited to each process, subprocess or piece of equipment using water. Other methods of flow measurement that may be effective are engineering estimates, heat balance, installing a temporary meter, volumetric measurement and other intuitive methods. Meters should be installed permanently where the meters should be regularly read and the data used for water management purposes. Information from submetering can improve the effectiveness of leak detection methods and equipment inspections.

In addition to process equipment, submeters provide reliable water use data for cooling towers, boilers, rinsing or cleaning equipment, fountains, and irrigation systems. For new facilities or when cost-effective for existing facilities, sanitary uses should be submetered so that leaks and malfunctioning equipment can be identified and promptly repaired. Proper sizing of submeters is an important consideration. Many industrial facilities require large meters that do not accurately measure water usage during low-flow periods. In order to have more accurate accounting for low flow rates in a high water use system, the water user should determine the feasibility of installing compound water meters or similar technology so that periods of low flow are accurately metered. Compound water meters have two water meters, one for high flow rates and the other for low flow rates. Cooling systems that use evaporation ponds should calculate a potential water balance on the system to determine the value of using submeters for determining evaporation and other losses. Submetering data can be used to identify water use patterns and variability within a facility and relative consumptive and non-consumptive uses of water. As water efficiency measures are implemented, the user can monitor the impact and resulting water savings. For industrial water users who discharge to sanitary sewer systems, submetering data can often be provided to the utility to reduce sewer fees by documenting evaporation losses on the cooling tower and other processes and equipment that consumes or evaporates water.

Implementation

Generally following the guidelines as outlined below, the industrial water user should conduct a facility survey and cost-effectiveness analysis.

1) Conduct a facility survey: Conduct a survey of the facility to identify all major water use areas and locate all existing submeters (if any) for the major water use areas. Determine sizing and locations for submeters for major water use areas that are not currently submetered.
2) Complete a cost-effectiveness analysis for installation of submeters: Determine if installing the submeters is cost-effective by estimating the cost of installing submeters compared to the value of water conserved using appropriate benchmarks. For example, determine if it would be cost-effective if submeters resulted in a 10 percent, 20 percent, 30 percent, etc. savings. Amortize the cost of installing submeters over the life of the equipment or other appropriate time period.
3) Complete and implement an action plan: The action plan should include a timetable to install submeters as well as a plan to use the data from the installed submeters to do a comparative analysis of all major water use areas and determine the cost-effectiveness of switching to a more efficient process, changing to more efficient equipment, and/or reducing water lost or wasted.
4) Update internal audit as necessary.

Schedule

1) The facility survey and cost-effectiveness survey should be completed in a timely manner. Surveys of very large or complex facilities should be completed within the first twelve (12) months of implementing this BMP. This is considered a reasonable time period to complete the survey.
2) The action plan should be completed and implemented in the normal business cycle immediately following the completion of the facility survey and cost-effectiveness analysis. For most facilities, twelve (12) months should be a reasonable time period to implement the action plan. Major facilities may need additional time for completion and implementation of the action plan.
3) If determined to be necessary for very large or complex facilities the schedule can be extended. BMPs should be initiated in the second year and continued until the targeted efficiency is reached.

Scope

To accomplish this BMP:

1) An industrial user should conduct surveys for each of its facilities following the schedule outlined in Section D.
2) For industrial water users with multiple facilities, a progressive implementation schedule should be followed, implementing the BMP in successive facilities until submeters have been installed in all facilities.
3) Cost-effectiveness considerations may result in partial implementation of this BMP at one or more of the facilities.

Documentation

To track the progress of this BMP, the industrial water user gathers and maintains the following documentation and can utilize industry accepted practices:

1) The facility survey report;
2) The cost-effectiveness analysis;
3) The action plan;
4) Schedule for implementing the action plan;
5) Schedule of actual installation of submeters in the action plan; and
6) Estimated potential water savings for each major water use area for each submeter installed.

Determination of Water Savings

Industrial water users should use the installed submeters to determine a baseline level of water use for each major water use area. The water use should be linked to a performance measure, production level, production curve or other output. For facilities with a significant seasonal demand, it may take a longer period of time to determine baseline use. Use the data collected to determine the cost-effectiveness of equipment and process changes in the other Industrial BMPs. Regular record keeping and analysis of submetering data can also help identify the occurrence and quantity of water saved from early repair of unobserved leaks.

Cost-Effectiveness Considerations

The industrial water user should determine the cost effectiveness to implement each identified replacement or equipment upgrade, utilizing its own criteria for making capital improvement decisions. Both the capital costs of installation of identified meters and the ongoing expenses for reading and maintaining the meters should be considered. In some cases, meters installed within an industrial site may be considered as part of implementation of other specific BMPs. Costs for meters generally range from $50 to $100 for those with smaller flow rates to several thousand for larger compound meters. Meters can be retrofitted for automatic or remote reading capability for a moderate additional expense which can be compared to savings in reading and data collection costs. Water meters have a typical design life of 10 to 15 years.

References for Additional Information

Resources that can assist an industrial water user in implementing this BMP:

1) *A Water Conservation Guide for Commercial, Institutional and Industrial Water Users*. New Mexico Office of the State Engineer, July 1999. http://www.seo.state.nm.us/water-info/conservation/pdf-manuals/cii-users-guide.pdf
2) *Handbook of Water Use and Conservation*, Amy Vickers, Waterplow Press, May 2001.