

4.4 Industrial Water Waste Reduction

Applicability

This BMP is intended for industrial water users that could increase water use efficiency at facilities by prohibiting specific wasteful activities such as wasteful irrigation practices and scheduling, single-pass cooling, non-recycling decorative fountains, discharge of process water and use of inefficient water softeners. In addition, if the facility has a substantial amount of unaccounted-for water, a leakage survey may need to be conducted. Once an industrial water user decides to adopt this BMP, the water user should follow the BMP process closely in order to achieve the maximum water efficiency benefit from this BMP.

Description

A comprehensive program to reduce water waste is an effective method of improving water use efficiency. Benefits from implementing this BMP include lower utility costs, energy savings, reduced process costs and an enhanced public image. If the Water Audit BMP has been completed, some of the information needed for this BMP will already be available.

The industrial water user should first conduct a pre-survey, which is a walk-through of the facility to find out if there are any obvious wasteful activities taking place. Then a facility survey should be conducted and the following questions should be addressed:

- 1) How much water is being used?
- 2) Where is the water being used?
- 3) When and for how long is water being used?
- 4) How is water being used?
- 5) Who is using water?
- 6) Why is water being used?
- 7) Do we need to be using water at all?
- 8) Can the water quality of a process discharge be matched with the water quality of another process or equipment need?

In addition, depending on the type of facility being surveyed, water wasting practices should be identified, including, but not limited to, water waste in single pass cooling systems or equipment; non-recirculating systems in all new conveyer or in-bay automatic vehicle wash and commercial laundry systems; non-recycling decorative water fountains; discharge of process water that could potentially be reused within the facility for another process use or for irrigation; and use of inefficient water softeners. Other water waste practices may include wash and rinse processes which run for longer time periods or at greater flow rates than needed or processes in which water is used as a conveyance.

Irrigation use can also be a source of water waste. Water waste during irrigation includes water running down the gutter; irrigation heads or sprinklers spraying directly on paved

surfaces such as streets, parking lots, and driveways; operating an automatic irrigation system without a functioning rain shut off device; operating an irrigation system that has misting heads due to broken heads or failure to install pressure reduction device; irrigating between 10 a.m. and 6 p.m. during seasons with high evapotranspiration; and irrigating more than required by actual or reference evapotranspiration.

Proper controls can limit water use to the minimum necessary in many facility processes. Limiting or eliminating the use of water in facility wash down operations is also another potential means to reduce water waste. Significant water savings can also be achieved through a proactive and frequent facility leak detection and repair program that addresses all facility pipes, valves, plumbing fixtures, and process equipment.

Implementation

The industrial water user should conduct a facility water use survey. References that provide more detailed audit procedures are listed in Section I below.

- 1) Conduct a facility water use survey of all equipment, processes and practices to determine all places where there could be wasting water, use of water inefficiently or possible sources of water lost to leakage. Next, possible remedial actions should be ranked, in ascending order of efficiency value. These include
 - a. Adjust equipment or process to use less water,
 - b. Modify equipment or install water saving devices,
 - c. Replace with more efficient equipment,
 - d. Recycle water within the process or plant by matching the water quality of a process discharge with the water quality of a process or equipment need, and
 - e. Change to waterless equipment or process.
- 2) Preparation of a report that details the results of the facility water use survey with calculations and costs of replacing water wasting equipment, processes and practices. For some practice changes, such as irrigation scheduling, the actual costs may be minimal.
- 3) Prepare a cost-effectiveness analysis for each type of equipment and each process or practice change. The cost-effectiveness analysis determines water efficiency opportunities that are cost-effective to implement. The analysis may also identify water efficiency opportunities that should be implemented even if not cost-effective due to high visibility, ease of implementation, or general employee and customer and community goodwill. After analyzing the cost-effectiveness of each potential action to eliminate a water wasting practice, the industrial water user should proceed to develop an Action Plan.
- 4) Prepare an Action Plan: The action plan contains proposals and a timetable to implement the selected equipment, processes and practices.

Schedule

- 1) The facility water use survey, report, cost-effectiveness analysis and action plan should be completed in a timely manner. Very large or complex facilities should complete the facility water use survey, report, cost-effectiveness analysis and action plan within the first twelve (12) months of beginning this BMP.
- 2) The action plan should be implemented in the normal business cycle. Major projects may take additional time for implementation.
- 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) Organizations with one facility, or several facilities with the same or very similar industrial processes, should conduct a facility survey following the schedule outlined in Section D.
- 2) For organizations with multiple facility sites, or multiple industrial processes, a progressive implementation schedule should be followed, implementing the BMP in successive facilities until all facilities have been surveyed and wasteful equipment, process and practices changed.

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) Cost-effectiveness analysis;
- 3) The action plan;
- 4) Schedule for implementing the action plan;
- 5) Documentation of actual implementation of items contained in the action plan; and
- 6) Estimated water savings and actual water savings for each item implemented.

Determination of Water Savings

The industrial water user should calculate water savings based on the calculation methodology appropriate to the identified water efficiency opportunities.

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. Obvious water wasting practices should be corrected as soon as possible without a cost-effectiveness analysis. The water waste reduction survey and report may be conducted and prepared by either the industrial water user's own staff or by specialized

outside consultants. There may be additional one-time costs for equipment such as flow meters or leak detection equipment.

References for Additional Information

- 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.
- 3) *Water Efficiency Guide for Business Managers and Facility Engineers*, State of California Department of Water Resources, October 1994.
- 4) *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, Pacific Institute, November 2003.
http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf
- 5) *Commercial and Institutional End Uses of Water*, AWWA Research Foundation, Summer 2000.