WATER CONSERVATION BULLETIN 3

BEVERAGE/FOOD PROCESSING INDUSTRIES

Excessive demand and below average rainfall have caused the Quabbin Reservoir - your source of water - to drop to unacceptably low levels in recent years. There is a pressing need for improved conservation efforts by all water users in order to ensure an adequate supply now and in the future. Reduced water use will also enable you to control your water, sewer and energy costs.

There is much that you can do to help. Begin with a thorough water audit to determine where, how, how much and how efficiently water is being used at your facility. In the weeks and months ahead, you can use this initial data to measure the success of your conservation efforts. (For your free Water Audit Handbook and sample audit report format, call 617-242-SAVE.)

An audit is a simple, inexpensive first step that will give you ideas about how water can be saved most quickly and easily. So ***don't delay.*** Even the most basic conservation measures - like fixing leaky toilets - will make a big difference.

> Be smart about how you use water at work - and at home. Regardless of weather conditions or reservoir levels, water should *always* be treated as a precious natural resource.

Evaluate current water use

To determine your facility's water-saving potential, identify areas where water is wasted or where water could be reused.

- Identify all points where water is used, including hose connections. Determine the quantity of water used at each point
- Check plumbing for leaks and turn off any unnecessary flows.
- Read meters monthly to monitor the success of water conservation efforts. Compare usage to the same period last year.
- Figure the capacity and emptying frequency of each water-containing unit.
- Determine the quality and quantity of each continuous discharge that is not currently reused.
- Adjust flow rates in floor gutters for minimum flow to prevent solids accumulation.

Operations & equipment

- Install high-pressure, low-volume nozzleson spray washers.
- Use fogging nozzles to cool product.
- Install in-line strainers on all spray nozzles; inspect regularly for clogging.
- Develop plans to increase reuse consistent with Mass. Department of Health requirements, such as screening and disinfecting reclaimed water.
- Install cooling towers to replace once-through cooling.
- Investigate changingcooling tower treatment to ozone to reduce make-up.
- As equipment wears out, replace with water-saving models.
- Replace high-volume hoses with high-pressure, low-volume cleaning systems.
- Use water-efficient conveying systems. Handle waste materials in a dry mode if possible.
- Adjust overflows from recirculation systems by controlling the rate at which make-up water is added.
  1. Install a float-controlled valve on the make-up line.
  2. Close filling line during operation.
  3. Provide surge tanks for each system to avoid overflow.
- Turnoff all flows during shutdown (unless flows are essential for cleanup). Use solenoid valves to stop the flow of water when equipment is not in use.
- Adjust flows in sprays and other lines to meet *minimum* require ments.

Beverage Industry:

- Adjust pump cooling and flushing water to the minimum required.
- Determine whether discharges from any operation can be substituted for tap water supplied to another operation.

Potentially reusable discharges include:

1. Final rinses from tank cleaning, keg washers, fermenters
2. Bottle and can soak and rinse water
3. Cooler flushwater, filter backwash
4. Pasteurizer and sterilizer water

Areas of possible reuse are:

1. First rinses in wash cycles
2. Can shredder, bottle crusher
3. Filter backflush
4. Caustic dilution
5. Boiler make-up
6. Refrigeration equipment defrost
7. Equipment cleaning, floor and gutter wash

Food Processing Industry:

- Use conveyor belts for product transport. Preference should be given to "rabbit-ear" or V-shaped roller supports since these are much easier to clean.
- Use pneumatic conveying systems where practical.
- Use flumes with parabolic cross-sections rather than flat- bottom troughs.
- Consider these alternatives to water-intensive units:
  1. Rubber-disc units instead of raw product cleaning and peeling
  2. Steam instead of water blanchers
  3. Evaporative coolers instead of water-cooled systems
- Establish optimum depth of product on conveyors to maximize wash water efficiency.
- Substitute discharges from one operation for fresh water supplied to another operation. Flushing floors and gutters is just one example of a use for reclaimed water.
- Divide spray wash units into two or more sections and establish a counterflow reuse system.
- Control belt sprays with a timer to allow for the intermittent application of chlorinated water.

Maintenance

- Equip all hoses with shut-off nozzles.
- Ask employees to use hoses only when necessary.
- Sweep or shovel solid materials from the floor - do not hose.
- Inventory all cleaning chemicals. Determine their water-use efficiency and whether they are being used correctly.

Restrooms

- Repair leaking toilets, faucets and showers. One ***leaky toilet can waste more than 50 gallons of water a day. A dripping faucet or shower can waste 75-1000 gallons a week!***
- Install aerators, spring-loaded valves or timers on all faucets.
- Install water-saving showerheads.
- Reduce the water used in toilet flushing by:

  - installing toilet tank displacement devices (weighted bottles or dams).

  - retrofitting existing flushometer toilets with a water-saving diaphragm to save 1 gallon per flush. (Most flushometers use 5 gallons per flush.)

- Replace worn-out fixtures with water-saving models.
- Install code conforming 1.6 gallon-per-flush low-flow toilets.

> As of March 2, 1989, the Massachusetts Plumbing Code requires the use of low-flow tank-type and floor-mounted flushometer toilets in all new or replacement installations.

- Encourage water conservation in all restrooms. (Mirror sticker are available from the MWRA.)

Outdoor conservation

- Sweep - never hose - sidewalks, driveways, loading docks and parking lots.
- Wash vehicles less often.
- Water in the early morning or evening when wind and evaporation are lowest. ***Never water on windy, rainy or very hot days,***
- Water only when needed. One inch of water per week (rain plus supplemental watering) is plenty to sustain established lawns and landscaping.
- Wait 10-14 days before watering after a period of heavy rain.
- Install timers, and either tensiometers (soil moisture indicators) or rainfall sensors on sprinkler systems
- Water uniformly and avoid runoff. Make sure sprinklers cover just the lawn or garden - not sidewalks, driveways or other paved areas.
- Limit lawn areas - grass needs a lot of water. Check with a landscaper about designs that require less water.
- ***Raise mower blades in the summer to 2 1/2 - 3 1/2 inches. Longer grass retains more water and nutrients.***
- Do not fertilize in the late spring or summer. New growth requires extra water.
- Mulch around plants to reduce evaporation and discourage weeds.
- Be sure all hoses have shut-off nozzles.
- Install pressure-reducing valves where pressure is higher than 50-60 pounds per square inch.

• Investigate the advantages of installing a drip irrigation system to water flowers, shrubs and new plantings more efficiently. I. ***could save you 30%- 70% of the water used by an overhead sprinkler system.***

Start a water conservation program

• Assign the responsibility for a water conservation program to an individual employee. Give him or her the necessary support and authority.

• Make your plant manager and other employees aware of the importance of the water conservation coordinator's function.

• Educate employees about various methods of water conservation at home. Materials are available from the MWRA by calling 617-242-SAVE.

1. Explain the importance of each employee's conservation efforts.
2. Locate water conservation suggestion boxes in prominent areas.
3. Post reminders and results-to-date.

• Read water meters at least monthly to monitor the success of water conservation efforts. Compare usage to the same period last year.

CASE STUDY: BOTTLING COMPANY/GREATER BOSTON

Potential annual water conservation 12 million gallons
Percent reduction in total use 15%

Conservation Measure	Gallons Saved	Net Cost	Savings	Payback Period
Low pressure pumps	6.1 mgy*	$38,000	**$46,850**	10 months
Water pressure reduction	.1 mgy	500	370	17 months
Temperature control regulator	1.0 mgy	500	3,375	2 months
Closed-loop cooling system	.9 mgy	3,600	2,430	18 months
Replace pump gland seals	1.5 mgy	195,200	114,000	20 months
Repair leaking faucets	.8 mgy	750	2,800	4 months
Close outdoor fountains	2.0 mgy	10,500	8,700	14 months
TOTAL SAVINGS	12.4 mgy	$249,050	$178,525	Avg. 1 year

This large facility includes corporate offices, the bottling liner quick-freeze operations and a distribution warehouse. Of the 180 mgy used in the plant, 55% is used directly in the product. The savings listed above represent an 18.5% reduction in non-product consumption.

Small changes yield major savings. No single measure was targeted for water conservation. After examining water use in all parts of the plant, a number of small changes were made to utilize water more efficiently. The result: A large cumulative reduction in water consumption.

* million gallons per year

For further water conservation information, please call:

617-242-SAVE

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