



EH&S Fact Sheet: Water Conservation for Building Managers – Lessons Learned

EH&S continues to work with Building/Facilities Managers and other technical staff supporting their efforts to identify water conservation opportunities in Harvard buildings. Conserving water benefits Harvard, as well as the environment, and has resulted in significant cost savings for building operations.

This fact sheet presents guidance on water conservation and focuses on “real-life” examples at Harvard where water conservation efforts have been successful. The hope is that all building managers can learn from these success stories and determine the potential for implementing water conservation at their facilities. Please contact EH&S (Gary Alpert 495-1983) for more information on these examples, as well as additional information on water conservation opportunities.

A recommended first step in developing a water conservation plan for your building is to evaluate your building’s current water use and discharge levels. Establishing this baseline water use/discharge can help you to investigate seasonal flow or building operations flow fluctuations that can help to identify where to target your efforts. Water use and discharge data is available from your water meters (contact Engineering & Utilities for assistance), as well as flow meters installed on pH neutralization systems. Examining flow meter data to profile building water usage during evenings, weekends and holidays should reveal minimal discharge when the building is unoccupied. By paying attention to spikes in flow during low use periods, building managers have been able to track down and repair solenoids, identify and remove sinks aspirators and appreciate the contribution of a single source to water use and discharge.

- **Inspect/Replace Water Solenoids:** Water solenoids are plumbing valves used to shut off incoming flow when equipment is turned off. Water solenoids are present as inlet feed valves in washing machines, water purifiers, dishwashers, icemakers, vending machines, and coffee makers. When these solenoids are not properly operating or maintained they can become stuck in an open position resulting in tremendous water loss. You can determine if you might have a water solenoid stuck in the open position by disconnecting power to the device (e.g. dishwasher, water purifier, etc.). Shutting off power should immediately stop any water flow through the valve. If it doesn't, the solenoid is likely defective. You can ask your plumber to inspect existing water solenoids to ensure that they are operating properly (i.e. close completely when shut off, etc.).

The New Research Building (NRB) on the Longwood Campus was able to save 25,000 gallons of water per day by addressing defective water solenoids. Working with EH&S, NRB building operations staff recognized that discharge flow data from their pH system flow meter indicated a considerable flow of water even after hours and on weekends when one would expect flow to be greatly reduced. NRB building operations staff conducted a survey of all water solenoids and found one of their cage washer solenoids stuck in the open position. After this solenoid was repaired, the discharge flow was reduced by 25,000 gallons per day.



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- **Recirculate Non-Contact Cooling Water:** The use of city water to cool equipment such as, refrigerators, emergency generators and other devices, produces non-contact cooling water. The MWRA does not allow discharge of non-contact cooling water to the sewer system. Reuse and recirculation of this water will result in significant water savings. This water must be plumbed to be re-used and re-circulated and not simply directly discharged.

The Chemistry and Chemical Biology Department on the Cambridge Campus initiated a project several years ago to identify and eliminate sources of flow-thru non-contact cooling water. Older equipment was replaced with equipment using re-circulated water at a significant cost savings.

- **Install Timer/Shut-off on Kodak X-Omat Photoprocessing Units:** When not in use, Kodak X-Omat photo-processing units discharge water continuously. A solenoid linked to a timer should be installed on these units to conserve water when these units are not in use. EH&S has identified a total of 50 X-Omat units at Harvard University. If all of these units were equipped with solenoids/timers, approximately 6 million gallons of water per year could be conserved. Contact Facilities Maintenance Operations (FMO) or your plumbing contractor for assistance with the installation of solenoid/timer.
- **Monitor Temperature of Quench Water Discharges:** Quench water is used to cool the discharge from autoclaves, dishwashers, cage washers and other high temperature equipment. Local plumbing regulations require hot water discharge to be cooled below 160 (Boston) or 150 (Cambridge) degrees Fahrenheit before mixing with building discharge. To meet this requirement, some equipment can “over-quench” the hot water discharge thereby resulting in significant water waste. Verify that discharge from high temperature equipment is quenched such that temperature levels are just below the temperature thresholds. You may also be able to adjust the thermometer reading on the piece of equipment so that significantly less water is required to cool the discharge on every cycle.
- **Reuse of Reverse Osmosis Reject Water:** The MWRA requires that RO reject wastewater be re-used before final discharge. The solution to how to re-use this water will vary from building to building, but all re-use applications will result in long-term water savings. Examples of RO reject reuse include “gray” water uses (e.g. toilets, non-potable sinks, etc.), quench water, etc.

Research facilities including the New Research Building on the Longwood Campus and the newly designed Biology Research Infrastructure (BRI) building will use discharge RO reject water to make up a large portion of this quench water with significant savings.