

WATER CONSERVATION CHECKLIST :



HOSPITALS/MEDICAL FACILITIES

EVERY DROP COUNTS!

GETTING STARTED

This checklist will help facility managers evaluate where to look for water-saving measures. As different as many hospitals and medical facilities can be, they have similar water uses in equipment, operations and procedures. Hospitals and medical facilities instituting water-saving measures have historically seen significant operating cost and energy savings.

To reduce water consumption whether in an office or commercial/industrial setting, consider the three-step process below. Foremost, employees must understand how their job affects water use in their work environment. Solicit ideas from those most involved with the daily operations and activities of the organization. Make conserving water part of their job by having them identify where water is used, whether in bathrooms or manufacturing operations. Once the areas of water consumption have been determined, engage the employees to help implement conservation measures.

- Educate and involve employees on water conservation,
- Locate all water using sources (bathrooms, wash sinks, hoses, dish machines, HVAC, cooling water, etc.) in facility; and
- Identify and implement water conservation options.

OPERATIONS AND EQUIPMENT

- Recycle and reduce water use wherever possible, consistent with state/local regulations.
- Conduct a water use survey to update current water use needs. Medical methods, processes and equipment are constantly upgrading, thus changing the need for water in some areas.
- Evaluate daily routines of staff (i.e. patient showering, cleanup, scrubbing and handwashing)

and encourage efficient practices and procedures regarding water use.

- Set up a system for all facility staff to look for and report leaks and constantly running water sources. Some large facilities have had hidden leaks, or failed valves, that ran for years before discovery.
- Use full loads in sanitizers, dishwashers, sterilizers and laundry washing machines, consistent with infection control requirements.
- Install automatic valves on film processing or X-ray equipment to stop water flow when equipment is not in use. Use temperature control valves.
- X-ray film processors in hospitals use an average of 3.2 acre-feet (1.04 million gallons) of water per year. Package systems are now available for those units that reduce water use to only .1 of an acre-foot (32,585 gallons) per year.²
- Recycle brine from reverse osmosis or filter backwash for cooling.
- Replace lab aspirators with a central vacuum system.
- Eliminate use of city water for cooling sterilizer condensate before dumping to drain when possible, considering drain material and diversity of drains or available floor space for holding tanks.
- Reduce flow to surgical vacuum pumps to acceptable minimum level and maintain proper operation.
- Look for and inventory all single-pass or once-through cooling systems. The types of equipment that typically use single-pass cooling water are: ice machines, X-ray machines, CAT scanners, degreasers, hydraulic equipment, condensers, air compressors, welding machines, vacuum pumps and air conditioners. Various options for saving this water range from shutting off water when not in use, to closed loop systems, to recycling the water elsewhere.



NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
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Success Stories

- ❑ Carney Hospital in Dorchester has several refrigeration and air conditioning units that are cooled with once-through water. By incorporating these units into a recirculating closed-cooling loop, the facility can reduce water consumption by three million gallons per year to save more than \$20,000 in annual water and sewer costs. Initial cost of this project is estimated at \$29,000, and payback would occur in less than 18 months.³
- ❑ New England Memorial Hospital had an opportunity to save water in its x-ray developing process. By retrofitting the flow restrictors to the developing machines, water consumption can be reduced by 176,000 gallons annually. The estimated cost of modifying the machines is \$150 and the water and sewer savings is approximately \$1,400, resulting in a payback of less than two months.³
- ❑ In one New England-area hospital, a solenoid valve on a bacteriology lab incubator failed, resulting in an unnecessary constant flow of 5 gpm, or 2.6 million gallons annually. At present water and sewer rates that is \$18,000 wasted per year. The cost to rectify the situation is estimated at \$200, giving an immediate payback.³

BATHROOMS / RESTROOMS

Domestic water use accounts for an average of 24 percent of the water use in health care facilities. The following suggestions are more than just a good idea. Low-volume water fixtures are also required by most local building codes.¹

- ❑ Repair leaks! A leaking toilet can waste more than 50 gallons of water each day, and a dripping faucet or showerhead can waste up to 1,000 gallons per week.
- ❑ Install flow control fixtures on all faucets.
- ❑ Showerheads and toilets that must be replaced due to normal wear-and-tear should be replaced with low-volume models, which are widely available.
- ❑ Low-volume showerheads use only two gallons of water each minute; older models may use as much as three gallons per minute.

Water use in toilets can be reduced by:

- ❑ Installing toilet tank water displacement devices, such as toilet dams, bags or weighted bottles.

- ❑ Retrofitting flushometer (tankless) toilets with water-savings diaphragms, which save one gallon (20 percent) per flush.
- ❑ Replacing toilets with low-volume models. Toilets can use as much as 4.5 gallons per flush, while low-volume toilets use only 1.6 gallons per flush. An average savings of more than 7 percent of a hospital's total water use was possible through this one water conservation action.
- ❑ Install springloaded valves or timers on all non-clinical faucets.
- ❑ Use aerators on faucets.

Water use in urinals can be reduced by:

- ❑ Setting urinals with programmable automatic flush valves to a water-saving mode that flushes the urinal after more than one use.
- ❑ Replacing urinals with low-volume models. Urinals can use as much as five gallons per flush, while low-volume urinals use only one gallon per flush.

Success Stories

- ❑ Carney Hospital in Dorchester is installing flow control fixtures on all patient and exam room faucets at its facility. The existing flow rate of the faucets was measured at 5 gallons per minute (gpm). After retrofitting the faucets, the flow was reduced by 3.5 gpm to 1.5 gpm. The average usage of sinks at the facility is estimated at 25 minutes per day. This results in a water savings of 88 gallons per day, or 32,000 gallons of heated water per year for a combined water and energy savings of approximately \$280 annually per sink. The cost to retrofit one sink is estimated at \$12, resulting in a payback of less than one month.³
- ❑ New England Memorial Hospital in Stoneham has more than 300 flushometer toilets in its facility, which use approximately 4.5 gallons per flush. Replacing all the existing toilets with ULF toilets would save more than 5 million gallons of water annually based on estimates of average daily population in the hospital and information on toilet use. The cost of this measure is estimated at \$65,000 and the water and sewer savings of approximately \$42,000 result in a payback of 18 months.³

LAUNDRY

- Evaluate wash program considering daily wash loads. Consult manufacturer for specifications regarding minimizing water necessary for various load soil conditions.
- Check with chemical vendor and evaluate wash formula.
- Investigate a rinsewater reclamation system to reuse rinsewater for wash cycle.
- Consider installing a washwater and rinsewater treatment and reclamation system.

Refer to Industrial Laundering Operations Checklist for more information.

Success Story

Newton-Wellesley Hospital recently had a rinsewater reuse system installed in its laundry that the installer estimates will reduce water consumption in the laundry process by 1.8 million gallons annually.³

BUILDING MAINTENANCE

General

- Check the water supply system for leaks and turn off unnecessary flows.
- Shut off the water supply to equipment and areas that are unused.
- Discontinue water circulation pumping in areas not in use.
- Read water meters at least monthly. Compare the results to the same month of the previous year. This will help to identify leaks as they occur, as well as monitor your conservation efforts.
- Check the pressure. Where system pressure is higher than 60 psi, install pressure-reducing valves.
- Consider using water-efficient ice machines.

Heating/Cooling (Cooling can account for up to 53 percent of the water use in a hospital.)

- Reduce excessive blowdown! Many cooling towers operate below the suggested levels of total dissolved solids (TDS) unnecessarily. Adjust boiler and cooling tower blowdown rate to maintain TDS at levels recommended by manufacturers' specifications. Inspect all floats and valve switches on older towers on a more frequent basis.

- Return steam condensate to the boiler for reuse.
- Consider using ozone as a cooling tower treatment to reduce water used for makeup.
- Shut off water-cooled air conditioning units when not needed, or replace water-cooled equipment with air-cooled systems.
- Check steam traps periodically; repair when necessary.

Cleaning

- Water used for general cleaning averages 10 percent of all of the water used in a hospital.
- Overhaul faulty steam traps on sterilizers.
- Instruct cleaning crews to use water efficiently for mopping.
- Switch from "wet" carpet cleaning methods, such as steam, to "dry," powder methods.
- Change window cleaning schedule from "periodic" to "as required."

Success Stories - Norwood Hospital

- Elimination of Seal and Cooling Water on Medical Air Compressors and Vacuum Pumps** - Recirculating seal and cooling water for four vacuum pumps and one medical compressor as well as removing a vacuum pump that was not needed resulted in a net annual savings of 8.5 million gallons.

Project cost: \$19,500 - Annual Savings: \$55,686
Payback: 0.35 years.⁴

- Refrigeration System Retrofit** - Facility staff discovered the refrigeration system serving the morgue was cooled with once-through cooling water. In 1994 the system was replaced with an air-cooled unit, thereby eliminating 2.1 million gallons per year. Project cost: \$5,500 - Annual Savings: \$13,750
Payback: 0.40 years.⁴

- Increase the Cooling Tower Concentration Ratio from Four Cycles to 12** - Reducing the amount of water that is bled from the cooling tower would result in a savings of roughly 600,000 gallons per year. The chemical treatment vendor should be contacted to confirm that this would have no adverse effect on tower operation. Since this measure requires only the adjustment of the set point on the bleed-off controller there is no initial cost -- payback is immediate. Project cost: \$0 - Annual Savings: \$3,900⁴

CAFETERIA/FOOD SERVICE

- Turn off the continuous flow used to wash the drain trays of the coffee/milk/soda beverage island. Clean thoroughly as needed.
- Adjust ice machines to dispense less ice if ice is being wasted.
- Upgrade equipment with water-efficient models.
- Provide table signs urging water conservation.

Dishwasher Hints

- Wash only full loads in the dishwashers.
- Turn dishwashers off when dishes are not being processed.
- Control flow of water to garbage disposal or consider eliminating the use of the disposal.
- Reuse the rinse water from the dishwasher as flush water in garbage disposal units.
- Install spray rinsers for pot washing and reduce flow of spray rinsers for prewash.

Refer to Food Service Operations Checklist for more information.

Success Story

Milton Hospital has installed a foot pedal-operated spray rinser on the pot scrubbing sink in their kitchen. This has resulted in a much more efficient rinsing process, saving approximately 370,000 gallons of water per year. The cost to implement this measure today is estimated at \$240 and the annual savings is approximately \$3,300 resulting in a payback of less than one month.³

OUTDOOR WATER USE

General

- Be sure all hoses have shutoff nozzles.
- Use a broom, rather than a hose, to clear sidewalks, driveways, loading docks and parking lots.
- Wash vehicles only when needed.
- Investigate the availability of reclaimed water for irrigation and other approved uses.

Landscaping

- Apply water, fertilizer or pesticides to your landscape only when needed. Look for signs of wilt before watering established plants. Any contractors

and/or employees need to be informed of the water saving practices the facility wants followed.

- Water early in the morning or in the evening when wind and evaporation are lowest.
- Install an automatic rain shutoff device on sprinkler systems.
- Consider using low-volume irrigation, such as a drip system.
- Avoid runoff! Make sure sprinklers are directing water to landscape areas, and not to parking lots, sidewalks or other paved areas.
- Adjust the irrigation schedule for seasonal changes. Sprinklers generally do not have to be run as often in cooler weather or during the rainy season.
- Use mulch around landscape plants to reduce evaporation and weed growth.
- Consider using drought-tolerant, low-maintenance plants.

Refer to Landscaping/Irrigation Checklist for more information.

MAKE IT COMPANY POLICY

- Educate employees about the importance and benefits of water conservation.
- Create water conservation suggestion boxes, and place them in prominent areas.
- Install signs in restrooms and cafeterias that encourage water conservation.
- Assign an employee to evaluate water conservation opportunities and effectiveness.
- Develop a water management plan for your facility.

REFERENCES / LINKS

- 1 Water Conservation @ Work - Water Conservation Web <http://www.swfwmd.state.fl.us/watercon/waterwork/checkhospital.htm>

Southwest Florida Water Management District (SWFWMD) 2379 Broad Street, Brooksville, FL 34604-6899

(352) 796-7211 or (800) 423-1476 (FL only)

- 2 “The WaterLogue” Newsletter, Vol. 1, No. 7, December 2001
http://www.cuwcc.org/products_waterlogue.lasso
 California Urban Conservation Council - developed with funding and support from U.S. Bureau of Reclamation
- 3 “Water Efficiency & Management for Hospitals” Massachusetts Water Resources Authority (MWRA) Charlestown Navy Yard, 100 First Ave., Boston, MA 02129
 Web site <http://www.mwra.state.ma.us/water/html/bullet2.htm>
- 4 “Hospital Cost Reduction Case Study: Norwood Hospital” Massachusetts Water Resources Authority (MWRA)
 Charlestown Navy Yard, 100 First Ave., Boston MA 02129
 Web site <http://www.mwra.state.ma.us/water/html/bullet1.htm>

Hospitals use an average of 139,214 gallons per day (GPD) of water.		
Types of Water Uses	Average Water Use (% of total)	Potential Savings (% of total)
Cooling	53	32
Domestic	24	10
Cleaning	10	9
Kitchen	5	–
Process	4	–
Other	4	–
TOTALS	100% 139,214 gpd	51% 71,000 gpd

Source: ICI Conservation in the Tri-County Area of the SWFWMD. SWFWMD, November 1997. Survey of 26 Florida hospitals.



The North Carolina Division of Pollution Prevention and Environmental Assistance provides free, non-regulatory technical assistance and education on methods to eliminate, reduce, or recycle wastes before they become pollutants or require disposal. Call DPPEA at (919) 715-6500 or (800) 763-0136 or e-mail nowaste@p2pays.org, or visit DPPEA's Web site at <http://www.p2pays.org> for assistance with issues in this checklist or any of your waste reduction concerns.