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# Finding hidden water

Responsible use is the ultimate goal of water audits.

▶ It takes about 140 gallons of water to produce a dollar's worth of dog or cat food and 270 gallons of water to produce a dollar's worth of sugar, according to a study released earlier this year by researchers at Carnegie Mellon University. The report showed that much of the water used in private industry is hidden, mostly because it is not used directly. As the researchers dug deeper into the hidden or indirect use of water, they came to the conclusion that indirect use of water exceeded direct use by as much as 96 percent.

The researchers could not always determine if the water used for various products, from sugar to dog food, was not recycled or reused somewhere along the line. However, without question, they came to the conclusion that millions of gallons of water are used indirectly each year and that a great deal of this water may be unnecessary, if not simply wasted.

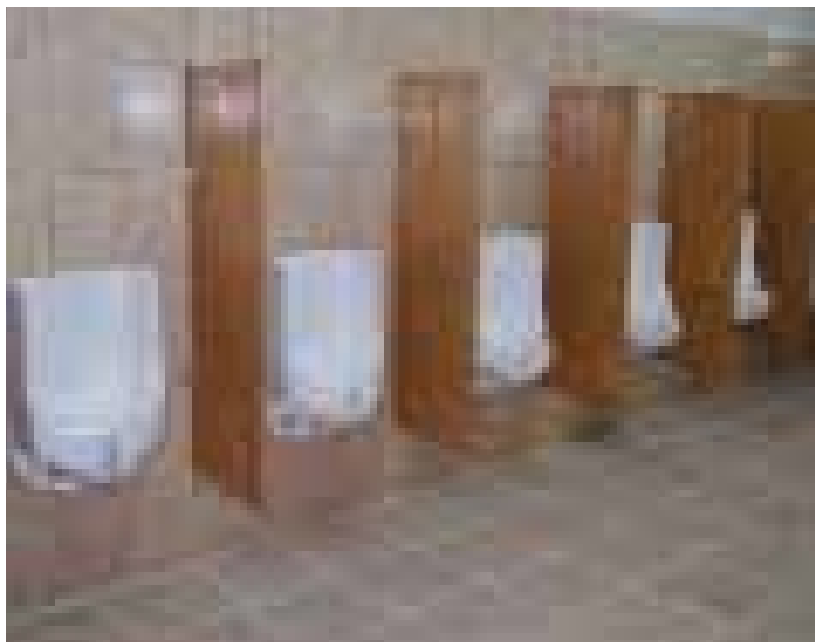
The goal of the study was to look for the indirect use of water and determine just how much is used. One conclusion from the study is the importance of water audits. By using water audits, industry leaders can know where water is being used, directly and indirectly, and where it can be used more responsibly and/or curtailed. Also, because water rates are rising, they can find ways to reduce operating costs.

## The water audit process

This opens the door for water treatment professionals and others in water-related industries to help their clients by conducting a water audit. The process can be involved and, in many cases, facility managers will not have the time, resources, experience or desire to conduct the audit. They prefer to turn it over to a professional.

So how is a water audit carried out? The following are key steps in the process:

- Conduct an inventory. Information is gathered to determine how much and where water is used in the facility. This will serve as a benchmark. Typically, this is accomplished by collecting billing information from the water supplier. Two, three or more years of bills are recommended to really get a grasp of how much water is consumed in the facility, if there are fluctuations and why and if more or less water is being used now than in the past.
- Ask the client for employment records. If more people were working in the facility several years ago, more water was likely being used.
- Ask for plumbing diagrams or architectural drawings that provide



plumbing information. This can be used as a guide to determine where water goes and how it is removed from the location. Pay special attention to landscaping irrigation and restrooms. These are often the key areas, followed by HVAC systems, where water is used in a facility.

- If a manufacturing facility, establish where water is being used and why. In one location, systems were still releasing water to manufacture a product that had been discontinued several years earlier.
- Investigate cooling towers and boilers. These systems typically require a certain amount of water be "bled" and replaced with fresh water. In some cases, this amount can be adjusted, so less water is used and the water released can be captured and reused for landscaping and related purposes.

It is often helpful if the facility has a zoned metering system. For instance, certain meters would register how much water is used in manufacturing and how

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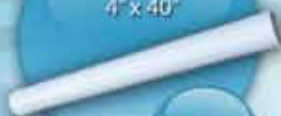
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much in office areas. This helps pinpoint where water is being used and, as referenced earlier, note if there are fluctuations and trends.

**Water problem areas:  
Landscaping and restrooms**

In most cases and in most types of locations, more water is used in a facility for landscaping and restrooms than anywhere else. That is why water use in these areas must be checked very carefully. This is also where the greatest water savings may be found.

As for the landscaping, a big concern is broken pipes or sprinkler systems that are not working properly. In one facility, it took a few months before they realized a landscaping pipe had broken. An alert account officer noticed the water bills,

which typically are paid by automatic debit, had jumped rather significantly.

Restrooms come in next as heavy water-use areas, specifically the toilets and urinals. The first step in making restrooms more water responsible is to ask: Do you know how old your toilets are?

Because toilets can last for decades and are easily repaired, it is not uncommon for locations to have toilets that were installed before 1992, when the federal government instituted regulations requiring toilets to use no more than 1.6 gallons per flush. However, the U.S. Green Building Council (USGBC) estimates that if all U.S. households installed toilets with water-saving features, "it would save an estimated 5.4 billion gallons of water every day."

Although urinals do not use as much water as toilets, new urinals are designed to use about one gallon of water per flush, down from two or more several years ago.

However, this is still a huge amount of water. Estimates vary, but most experts believe one water-efficient urinal can use as much as 30,000 to 40,000 gallons of water annually. This is why many facilities are now installing no-water or waterless urinal systems. On top of being more cost effective and less costly to maintain and install, these systems operate effectively and hygienically using no water whatsoever.

**The three bucket approach  
to water savings**

A final step in the water audit is helping the client determine which water conserving steps should be implemented based on the costs and the amount of water conservation sought. In some cases, the more costly measures can have the greatest water-saving impact.

Ultimately, it is the client who will decide what steps to take and when based

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on savings and costs. The water professional can group all the water-conserving measures discovered in the audit into three categories, often referred to as the “three bucket system.” These buckets are:

1. Water-reducing measures that can be implemented quickly at little cost. A good example of this is to simply find and fix all water leaks throughout the facility. One small office with five leaky faucets dripping about 30 drips a minute will waste more than 5,000 gallons of water annually.
2. Projects that can be instituted but will incur moderate costs. The state of Massachusetts determined that replacing all water-using urinals in state facilities with no-water systems would result in a significant water savings and could be done at relatively moderate expense.
3. Items that will be rather costly but

may produce the most significant water savings. An example of this involves landscaping or xeriscaping. When the MGM Grand opened in 1993, more than 85 percent of the building’s acreage was covered with thirsty lawns and flowering plants. It required the use of more than 60 gallons of water per square foot per year. Today, after considerable expense, most of these areas have been converted to xeriscaping — landscaping using low-water-consumption desert plants and ground materials. Now, the hotel grounds consume only 20 gallons of water per square foot per year.

The goals of the water audit are many. To use water more responsibly, ultimately reducing the amount of water consumed in a facility is a No. 1 priority and cost cutting is another. It should never be forgotten

that water and sewer charges in the U.S., although still low, are rising fast throughout the country. And, another benefit: An opportunity for the water professional to offer more services to his or her clients. And in tough economic times, providing more services such as this can prove to be very valuable indeed. **WT**

*A frequent speaker and author on water conservation issues, Klaus Reichardt is founder and managing partner of Waterless Co. LLC, Vista, California. Reichardt founded the company in 1991 with the goal to establish a new market segment in the plumbing fixture industry with water conservation in mind. The company’s key product, the Waterless No-Flush urinal, works completely without water. He is a member of U.S. Green Building Council since 1999 and the University of California Santa Barbara EcoEntrepreneur Advisory Board. He may be reached at Klaus@waterless.com.*



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