Case Study:

Sanitary Fixture Upgrades at EPA's NHEERL Facility

Narragansett, Rhode Island

Introduction

In October 2003, the National Health and Environmental Effects Research Laboratory (NHEERL), Atlantic Ecology Division facility in Narragansett, Rhode Island, issued its Water Management Plan to document and promote the efficient use of water at the facility. In this plan, the facility identified significant cost and water savings that could be realized by replacing its urinals with new, waterless urinals and upgrading its toilets with new, dual flushing mechanisms. Two years after installing the fixture upgrades, EPA estimates that it saves 350,000 gallons per year (gpy) of water, resulting in an annual cost savings of roughly $760. The project demonstrates a simple and efficient means to save water and money, while producing environmental benefits.

In total, NHEERL replaced nine urinals with waterless urinals and retrofitted 23 toilets with dual flushing mechanisms. The project began in early 2004 and was finished in late spring 2004. Most of the upgrades replaced toilets and urinals that were installed before 1992. This project, though small in scale, serves as an example to larger and more complex facilities that these types of upgrades can lead to tremendous ecological and cost benefits.

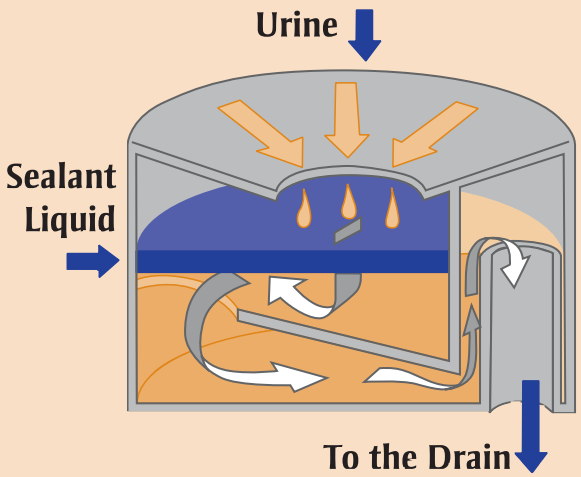
What Are Waterless Urinals and Dual Flush Toilets?

Waterless urinals are urinals that require no flushing, thereby eliminating the need for water. A cartridge is located at the bottom of the urinal that contains a liquid that is lighter than urine, allowing the waste to pass through the cartridge and out the waste drain. The cartridge seals the waste drain, which is plumbed as usual. Figure 1 illustrates how the waterless urinal works.

Dual flush toilets allow two different flush options for the toilet, depending on the user's needs. Lifting the handle in one direction

Aerial view of EPA's National Health and Environmental Effects Research Laboratory (NHEERL), Atlantic Ecology Division facility in Narragansett, Rhode Island.

Figure 1: Waterless Urinal Operation



initiates a reduced flush of 1.1 gallons per flush (gpf), eliminating liquid and paper waste. Pushing the handle in the opposite direction initiates a full flush (1.6 gpf), eliminating solid waste and paper. Figure 2 illustrates a typical dual flushing mechanism.

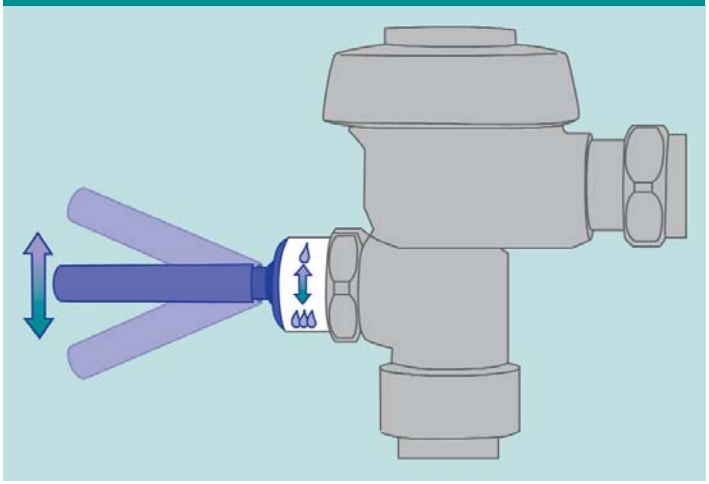
Employee Acceptance

To familiarize the employees with the new fixtures, the facility management placed placards above the toilets and urinals, which included instructions on how to use the new fixtures and information about how they work. Employees were also directed to the manufacturers' Web sites for further information. The facility's management noted that the retrofit required a cultural adjustment, but overall, the employees at the laboratory have reacted positively to the new waterless urinals and dual flush toilets. The waterless urinals in particular have generated positive comments among employees and visitors alike.

Costs and Savings

The total cost of the retrofit was approximately $3,800 (each waterless urinal cost $300, and each dual flush retrofit cost $46). There were no additional costs associated with installation, because these costs were built into the facility's operation and maintenance contract. Each waterless urinal took approximately 1.5 hours to install, and each dual flushing mechanism took 15 to 20 minutes to install. The switch to these new fixtures can save

Figure 2: Typical Dual Flushing Mechanism



the laboratory nearly 350,000 gallons of water every year, for a cost savings of about $760 per year. Through these savings, the upgrades will pay for themselves in about five years. Moreover, the facility has been able to garner additional savings, because the waterless urinals require less maintenance and improve sanitation in the restrooms. According to facilities operations specialist Russell Ahlgren, the new waterless urinals have eliminated recurring problems such as stuck handles and clogged drains. Table 1 presents the water and cost savings in gallons per year (gpy) associated with the sanitary fixture upgrades. This type of project has the potential to generate an even greater opportunity for savings when applied to larger, more complex facilities.

Table 1: Water and Cost Savings Associated with the Sanitary Fixture Upgrades

	Before Upgrade			After Upgrade			Savings
	Toilets	Urinals	Totals	Toilets	Urinals	Total	
Water Use	305,500 gpy	157,500 gpy	463,000 gpy	113,750 gpy	0 gpy	113,750 gpy	349,250 gpy
Water Cost	$667/year	$344/year	$1,011/year	$248/year	$0/year	$248/year	$763/year

For more information on EPA's National Health and Environmental Effects Research Laboratory Atlantic Ecology Division, visit <www.epa.gov/aed> or <www.epa.gov/greeningepa/facilities/narragansett.htm>.

EPA-200-F-06-002
August 2006

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