

Graywater Reuse - Is the Time Coming?

By Richard Scholze

Graywater or greywater or gray water or grey water! No matter how it is spelled, graywater is defined as the effluent from laundry and bathing/shower use in residential facilities. It does not include water from dishwashers and other kitchen waste water or toilets and urinals, which are collectively called blackwater. Another definition to be aware of is reclaimed water which is wastewater treated to high standards at municipal treatment facilities and then delivered to customers via a "purple pipe" system, common in water-short areas such as Texas, California, Arizona and Florida.

Water resources for the nation and military installations have been receiving increasing attention due to both water quantity and water quality concerns. Water scarcity is expected to worsen in coming years both nationally and globally. Ninety percent of water consumed on installations is for nonpotable uses and does not have to be of the highest quality. In addition, a number of legislative and executive drivers are impacting water use on installations. Graywater use is one tool available to installations for reusing the existing water supply to get maximum benefit.

Graywater use has a long history of use in arid parts of the U.S. and is still common in rural areas. Quantities of graywater available are estimated at up to 40 gallons per day per person.

Current Army Policy allows where life cycle cost-effective, reclaimed or treated recycled water to be used for irrigation and other non-potable uses such as toilet flushing. However, gray-water or untreated effluent from laundry, dishwashing, and personal hygiene/bathing will not be recycled or reused as part of a strategy to earn Leadership in Environmental and Energy Design credit without approval from the Installation Management Command.



Technologies to capture, filter, and reuse graywater are commercially available, such as this unit that catches water from lavatory use and recycles it for toilet flushing. Photo courtesy of WaterSaver Technologies. Used with permission.

The advantages of using graywater are several: it saves water (less potable water consumed), less discharge (reduction of sewage generated which often costs more to treat than potable water), less energy and chemical use for the water provider, recovery of nutrients (nitrogen and phosphorous present are essential nutrients for plant growth), and reduction of hydraulic load to existing sewer systems.

Disadvantages of using graywater include: it may be more costly (is water quantity or price the greater concern?), may decrease flow to the sewage plant (some areas have a requirement to deliver a certain amount of return flow to existing streams or water may be reclaimed and used for irrigation or other uses), there is a small potential for spreading disease through human contact if not properly handled or treated, and a potential for odors in surge or storage tanks if not handled properly or stored too long.

There may be controversy and reluctance in some areas for using graywater. The reason is a perceived potential health threat. However, there have been no cases reported to the Centers for Disease Control related to graywater use.

For military applications, the best time to use and design for graywater use is during new construction. The first step is to estimate graywater production. If the building is an office, it will probably not be cost-effective to incorporate. However, if the new building is a barracks, it may very well pay to incorporate. Life-cycle cost-effectiveness should be addressed as well as whether any water restrictions exist or are being anticipated. Then the end use is determined, whether the water will be used for toilet flushing or irrigation. That will impact system design. Separate systems are best installed in the new construction stage.

Commercial applications around the U.S. and world which may be available to the Army in the future and at larger scale include more complex operations. Larger quantities of used water will

be collected; city blocks and large buildings will have dual plumbing and communal systems with treatment. In addition, graywater will be combined with other sources such as rainwater.

The U.S. Army Engineer Research and Development Center is preparing a Public Works Technical Bulletin which will describe pros and cons of graywater use, a brief review of legal and health considerations, lessons learned from graywater applications in other arenas, and appropriate scenarios for use for toilet flushing, landscape irrigation or other acceptable uses. This PWTB will enable installations to determine the potential for graywater recycling or application at their facilities as part of a sustainable water program or as a supplemental water supply source. It is expected to be available in early fiscal year 2010.