By: Wisconsin Hospitality Linen Service and AquaRecycle

RECYCLING SYSTEMS IN LAUNDRIES

A Case Study

Wastewater treatment is not new, but for the laundry industry it is an emerging concept only recently receiving more serious consideration. This venue is being more thoughtfully considered in the laundry industry today as a result of increased sewage charges, increasing fuel cost for heating water, and the need to produce a quality product while maintaining cost. The purpose of this article is to provide basic information on the recycling processes utilized in institutional laundries and a checklist of issues to be thoughtfully considered, from an ALM member who has forged this new territory.

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Our fresh water supply is static. If all of the Earth's water were represented by a one-gallon bottle, the amount that could be drunk safely would equal one tablespoon, and every day more people and industries line up for a share of that tablespoon.

Population growth, industry, and agriculture are not only placing rising demands on this limited resource, there is little regard for maintaining its integrity as we rapidly spew toxins and pollutants into our waste streams. The more sewage we pour in, the less we can pull out, as there are limits imposed by legislation and the need of our rivers, streams, and lakes to continue to dilute the pollutants sufficiently.

Municipalities across the country are struggling to repair and renovate their crumbling water infrastructures. Rapid development in many cities has taxed the water treatment facilities, leaving many with no choice but to send untreated wastewater into our fresh water supply. Large-volume water users are facing fines, impact fees, and requirements to purchase additional sewer capacity.

As municipalities continue the struggle to provide adequate sewer capacity to accommodate the rising demands of growth, incentives are provided in some areas for large-volume water users to conserve water and reduce discharge. Reducing your wastewater discharge will provide much needed relief to the community wastewater treatment plant. Reducing sewage discharge and its pollutants may provide an opportunity to avoid the requirements of some communities to purchase additional sewer capacity or payment of fees as a result of planning for growth of your operation.

Wisconsin is no exception, as residential and commercial growth depletes the fresh water supply of Lake Michigan. In their efforts to promote conservation and encourage recycling projects in the state, The state's Department of Commerce passed legislation that requires close scrutiny, evaluation, and approval of any technologies that recycle or reuse water.

One Wisconsin laundry, Wisconsin Hospitality Linen Service (WHLS), has stepped up to the plate. This commercial laundry processes almost 8 million pounds of linen annually for Milwaukee-area hotels. Owned by Marcus Hotels & Resorts, a division of The Marcus Corporation, this Milwaukee-based, publicly traded company owns and manages 12 hotels and resorts in the Wisconsin area. Craig Rambo, Director of Engineering for Marcus Hotels and Resorts since 1993, recognized the environmental and financial benefits of water conservation and began extensive research into water recycling systems before selecting the AquaRecycle system.

How does recycling work in a laundry?

The basic concept is to process the "grey" water from the washer through a filtration system and recycle back into the wash process instead of routing waste water out of the facility and on to the public sewage treatment facility. The three processes reviewed utilize either: 1) a series of filters, 2) a ceramic filter membrane, or 3) a vibrating membrane filtration system.

Issues to Consider

The company WHLS chose, AquaRecyle, utilizes a multi-filter process to remove lint, minute solids, organics, chemicals, etc. and then disinfects the water before returning it to the wash process. Much time was spent in researching the various methods available. Some lessons learned included:

- Not all systems utilized a disinfection process. AquaRecycle utilizes an ozone injection system at the beginning of the process and ultraviolet disinfection at the end. Recent research from the University of Georgia reported that "combined simple ozonation with ultraviolet irradiation to synergistically enhance wastewater treatment in the food-processing sector," and that "similarly dramatic increases in treatment efficacy may be possible for textile wastewaters."[1]
- Another system required an additional 50 hp motor resulting in higher operational costs when utilizing a mock scenario during research.
- The ceramic filter membrane of one system did not remove chlorine during the process.

While chemical adjustments could be made to adjust the alkalinity, it would require continued monitoring and chemicals, both adding to the final operational costs. Additional labor costs would be incurred in the required cleaning process for the type of filters utilized.

There are pros and cons to every system. Of course the obvious advantages are water, sewer, and energy savings, not to mention the environmental benefits. The downside would include the initial investment and the fear, although inaccurate, that linen quality decreases. While other technologies will clean the water to drinking water quality, this is not necessary and water is lost in the process. "Spend your time and energy at the research end to determine what is best for your and your situation," advised Rambo.

In a recent discussion on his experience, Rambo emphasized the necessity for researching the recycling companies and their methods of recycling and identified four caveats for laundry directors:

1. Know the local, state, and federal **regulatory requirements** for installation and operation for water recycling.
2. **Clearly define and understand "savings."** Make certain that all parties involved measure utilization in the same way; that you all speak the same language.
3. **Develop sound partnerships** between the laundry, your chemical company/representative, and the recycling company. A good working relationship is critical here.
4. **Have a contingency plan.** Never make significant change without one.

Regulatory Requirements

Since the use of recycling systems in institutional laundries is still in its infancy, the regulatory requirements have not kept up with progress. "Be sure to ask questions at all levels of government, city, state, and federal," said Rambo. In this case, initially it was understood that no additional steps would be required, but further research revealed that WHLS would have to undergo further testing, even requiring that water be tested against potable water standards. Rambo emphasized how helpful AquaRecycle had been in this process by responding promptly and conforming with regulator's requests to modify equipment. "It would improve the process greatly if regulatory authorities could/would accept testing already performed and approved by other recognized authorities."

Clearly Define and Understand "Savings"

Rambo recommended installing additional measurement tools to compare what you are actually using and/or saving. This would be for all areas: gas, electricity, water, etc. Every laundry has its own standards for quality and, while quality may be a matter of opinion, achieving savings while maintaining your level of quality is essential to your operation. Realize going in that every laundry will vary and a savings of 75% over previous operational costs while maintaining your standards is a significant achievement, although it may not be the higher savings achieved with an acceptable product outcome.

Rambo stated WHLS customers were happy with the outcomes. "They have no problems with the addition of our recycling system. Ultimately, they benefit, since we will not encounter increases in cost due to rising fuel costs and our management at WHLS will not scrimp on quality, they get the same level of product and won't see charges go up as fuel costs continue to skyrocket."

Develop Sound Partnerships

Any laundry director will tell you that the relationship and communication with their chemical representative is key to quality, cost efficient operations. Wash water conditions must be monitored closely during any change. If the pH of the recycled water in the holding tank is too high, adding new water may correct the level. The three entities must work together to achieve the same goals.

"Fortunately for us, all egos were in check and everyone was in agreement on the desired outcomes. We have a wonderful working

relationship with the recycling company and our chemical distributor," said Rambo.

Have a Contingency Plan

Adjustments are always necessary, it's not something you can install and walk away saying "all is good," and this is the case with any alteration in the wash process. This system did offer WHLS the ability to valve around when maintenance or alterations were necessary. This type of contingency plan is a must, especially when the regulatory process takes awhile, so you can continue to provide quality services throughout the entire transition.

Rambo stated, "We are pleased with the outcomes. If we had it to do all over again, we would. Absolutely. We have seen substantial savings already, and, while I wish I already had six months of operational data back, we are very satisfied with where we are today. Prior to installing the recycling system, we used 1.3 gallons of water per pound of laundry, and today we are seeing utilization figures of a half gallon of water per pound of laundry. By doing the math, with 8 millions pounds processed last year, this is a real positive."

As water demands and environmental needs grow, water recycling will play a greater role in our overall water supply. By working together to overcome obstacles, water recycling, along with water conservation, can help us to conserve and sustainably manage our vital water resources.[ii]

[i] Cotton Textile Wastewater Treatment by Ultraviolet-enhanced ozonation published by the University of Georgia Department of Biological and Agricultural Engineering, Athens, GA

[ii] U.S. Environmental Protection Agency, Region 9, San Francisco, CA, www.epa.gov

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