WATER CONSERVATION AND WASTE MINIMIZATION IN THE FOOD PROCESSING INDUSTRY

Michael G. Powell

AUTHOR: Outreach Engineer, Biological and Agricultural Engineering, The University of Georgia, Athens, Georgia 30602.
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Abstract. Water has been used in the food processing industry as a medium of great convenience for transportation, heat transfer, and sanitation. However, since the 1972 clean water act, the average rate charged for water and wastewater by Georgia municipalities has increased from $0.50 per 1000 gallons of water, to todays price which is typically above $4.00 per 1000 gallons. These rates are expected to increase to over $7.00 per 1000 gallons by the year 2000. To individual processors, wasted water and inefficient wastewater treatment have a large economic impact. While there are limited options that individual processors can exercise to prevent increase in the cost of water, there are actions that the producer can take to conserve water usage and to increase the efficiency of wastewater pretreatment operations.

INTRODUCTION

Developing a water conservation / waste minimization program for a food processing plant is a very simple and economical way to increase overall plant efficiency. The steps involved are straight forward, but require planning and management commitment to make the program work. The underlying thought is: If you don't put product into the waste stream, you don't have to pay to take it out. Just as the body is made up of many parts that work together, a food processing plant has many contributing factors to total water use and waste discharge. So the first step is to Know Your Plant, inside and out, backwards and forwards.

Learning the layout of a food processing plant may be more involved than most people would think. Over time most plants have had modification and upgrades that have altered the original piping of the plant. Starting with a set of blue prints, if available, determine where incoming water lines are located, if water meters are present, pressure regulators, and back flow prevention. Follow water lines through the plant identifying main truck lines and what processes feed off from them. Once the incoming water flow patterns have been established, identify outgoing water flow patterns from the plant. Most plants will have more than one incoming and outgoing water sources, so make sure all have been identified. At this point it should be possible to develop a water balance for the plant, water in should equal water out plus estimated losses. It is a good idea to look at water data over a 10 to 14 day period to make sure all aspects of plant operations and down time are represented.

The next is stage is to evaluate the water use of individual pieces of equipment in the plant. It can take some time to accurately quantify everything in the plant, however as this task is performed take note of variations in water use of similar equipment or where water is being used inefficiently. Another aspect will be to determine water use patterns for the plant on an hourly, daily, and weekly basis. This is important when evaluating employees effectiveness in conserving water. If water usage stays at production level during breaks, this is a good indication that equipment is being left on when no product is being processed. These pieces of data will be very valuable when it comes time to implement water conservation practices in the plant, and in determining overall water savings.

Now that all water usage has been explored, it's time to evaluate sources of waste generation inside

the plant. In food processing, wasted product usually cost the company twice. One, it is product that wasn't sold or rendered for profit, and second, it effects the wastewater treatment cost and may contribute to surcharges or fines. Therefore it is important to be very meticulous in looking at waste generation, especially waste from ineffective equipment, plant personnel, and sanitation procedures.

Once all these pieces of information have been gathered, it's time to perform a 24 hour waste water characterization. This should include final plant effluent and all previous identified sources of waste generation. To perform a wastewater characterization, four types of information will be needed: location of wastewater sample, time sample was taken, volume of wastewater discharged, and concentration of contaminants in the sample. With this data it will be possible to develop a wastewater profile and quantify what is happening in the plant.

CONCLUSION

Water conservation and waste reduction in the food processing industry is a cost effective means to increase plant efficiency. This efficiency can be measured by the economic and environmental impact it has on the plant and in the community. The management procedures presented have been effective in saving Georgia companies millions of dollars each year in water and wastewater treatment cost. As water cost continue to rise and regulations become more stringent, this type of plant management will play a key role in helping the food processing industry stay competitive in a global market.

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