WATER CONSERVATION AND WASTE MINIMIZATION TECHNIQUES FOR GEORGIA'S FOOD PROCESSING INDUSTRY

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Abstract. Georgia's food processing industry continues to use water in staggering quantities for cleaning, sanitation, heat transfer, and waste transportation. However, Georgia's municipal water and sewer rates continue to increase. Food processors have the opportunity to save or recover literally hundreds of thousands of dollars each year by establishing water conservation and waste minimization programs within their facilities.

Using the essential foundation of both initial and continuous management support, food processors who institute water conservation program which emphasize leak detection and elimination, water pressure regulation, minimal clean water use, and process water reuse, can curb rising overhead utility costs associated with public water and sewer usage. Also, by using waste minimization techniques of dry cleaning, bi-product recovery, and process equipment observation, food processors can minimize the amount of sellable product lost to the waste stream.

INTRODUCTION

Traditionally, Georgia's food processing industry has viewed water as an endlessly abundant and inexpensive resource. Water has been, and continues to be, used in staggering quantities in food processing plants for: 1- cleaning / sanitation, 2- transferring heat, and 3- transporting waste. A recent study completed by the University of Georgia's Biological and Agricultural Engineering Department estimates that Georgia food processors release 10-11billion gallons of non-sanitary wastewater from their plants every year (Magbanua, 1998). However, with the introduction of the Clean Water Act in 1972, municipal water and sewer costs have increased from under $1.00 per 1000 gallons in the mid-1970's to over $7.00 per 1000 gallons in some areas of Georgia today. Consequently, water conservation and waste minimization have taken on new importance. Special note should be made of the significant impact that new HACCP (Hazard Analysis Critical Control Point) and other food safety programs have had on increased water usage at food processing facilities.

Prior to the start of any waste reduction or pollution prevention program, a food processing facility must establish a solid foundation of initial and continuous management support. Without this support, the effectiveness of any pollution prevention program will quickly dissolve (Merka, 1992).

An effective Water Conservation program uses techniques that follow the principle of "using the least amount of water to produce the highest quality product". Water Conservation programs should start with the background information of understanding a plant's water/sewer accounting system and using water use surveys to establish specific water use patterns. Then a systematic implementation of leak detection and elimination, water pressure regulation, minimization and monitoring of clean water use, and establishment of process water reuse, can curb rising overhead utility costs associated with purchased water and sewer service.

In conjunction, waste minimization techniques work under the principle of "if you don't put it in the water, then you don't have to pay to take it out". Programs should start with understanding the relationship between concentration and loading in a wastewater stream, process equipment observation, and waste stream analysis to identify specific locations and quantities of waste generation. Then by using techniques such as bi-product recovery and dry cleaning, less waste enters wastewater pretreatment facilities and more sellable product is produced for market sale.

INTERNET RESOURCES

FoodPAC (Food Processing Advisory Council): http://foodpac.gatech.edu

GETAP (Georgia Environmental Technical Assistance Program): http://www.bae.uga.edu/outreach/getap/index.html

GEP (Georgia Environmental Partnership): http://www.ganet.org/dnr/p2ad/

Georgia Water Series - Dr. Jeffrey L. Jordan Department of Agriculture & Applied Economics, University of Georgia - Griffin Experiment Station: http://www.griffin.peachnet.edu/water

WaterWiser Drip Calculator - Helps you Measure and Estimate Water Wasted Due to Leaks: http://www.waterwiser.org/books/dripcalc.html

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LITERATURE CITED

Magbanua, B., T. Adams, and M. Risse, 1998. A By-Product and Waste Assessment of the Food and Kindred Products Manufacturing Industries in Georgia. Report Prepared for the Pollution Prevention Assistance Division, Department of Natural Resources, Atlanta, Georgia.

Merka, W.C., 1992. In-Plant Waste Minimzation: Proceedings 1992 National Poultry Waste Management Symposium; p 123-127