Procter and Gamble

CASE SUMMARY 15

PROCTER AND GAMBLE HAIR CARE LLC

Iowa City, Iowa
Johnson County

Intern: Forrest Meggers
Major: Masters in Environmental Engineering
School: The University of Iowa

The Company

Procter and Gamble has manufacturing plants spanning the globe, from Asia to Europe and from North to South America. It manufactures many everyday products, including Bounty paper towels, Crest toothpaste, CoverGirl cosmetics, Old Spice deodorant, Cheer detergent, Nyquil and Vicks medicines, Scope mouthwash, and many shampoos and conditioners. The Iowa City plant primarily focuses on providing shampoos and conditioners for North America as well as Scope mouthwash. Herbal Essences, Pert Plus, Head and Shoulders, Aussie and Infusium 23 are some of the shampoo and conditioner brands produced.

Project Background

Procter and Gamble is focused on reducing pollution and has many recycling and waste reduction programs in place. The plant uses approximately 200 million gallons of water per year with a significant portion of that sent to the sewer. This creates an annual cost in excess of $3 million for water and sewer services.

Incentives to Change

Procter and Gamble is interested in reducing water consumption and improving the efficiency with which it is used. A large amount of product is sent down the drain during various washout procedures. This creates a high level of biochemical oxygen demand (BOD) in the water and increases the charge for sending the water to the municipal treatment plant. Reducing the amount of product entering the sewer is another primary interest.

Results

Three major options for annual savings were identified, one previously installed system was analyzed, and other environmental recommendations were made:

Savings options:

1) The Iowa City plant has six water accounts with the City of Iowa City. Two represent the majority of the water flowing into the plant, one is for sewer flow, one is for sewer BOD, and two other accounts are for newer buildings on the site. While analyzing the water use at the plant, it was noted that the accounts for the newer buildings included sewer charges based on the incoming water to those buildings. These buildings drain into the same sewer as the remainder of the plant. The entire flow and BOD of this sewer system is measured where it exits the

plant and heads for the treatment works, and billings are based on this flow. However, as the bills for the new buildings included a sewer charge, the plant was in effect being charged twice for the sewage from these buildings. The city was contacted and a dye test was performed to confirm the drainage pattern. The charges will be taken off these accounts, saving $30,000 annually, and the company will also receive a refund of approximately $150,000.

2) The plant recycles water in the scrubber towers onsite using discharge water from the filtration system. The scrubber towers run at a constant rate and the supply water varies, creating a mismatch of -60 to 140 gpm between the two systems. The 500-gallon storage tank is not an adequate buffer and is emptied and filled in less than 10 minutes. Once empty, water is supplied from the city. Once full, water is sent to the sewer. It is recommended that a large unused standpipe in the tank farm (approximately 80,000 gallon capacity) replace the 500-gallon storage tank. Modeling the proposed system with two months of water use data resulted in savings of approximately 10 million gallons of water per year, with cost savings of $80,000 annually.

3) The scrubber system removes HCl from a process air stream. The acidic water from the scrubber system is sent to a pit where it is neutralized with caustic before discharging to the sewer. There is an opportunity at the plant to use the HCl in another process. Implementing an acid recovery system will eliminate the caustic use, HCl will not need to be purchased and less water will be sent to the sewer. This would save six million kg of caustic, the cost and emissions from trucking purchased HCl, and five million gallons of water discharged to the sewer per year. The projected savings are $1 million for the caustic and, assuming a 75 percent recovery of HCl, $5 million in assets for HCl produced, for total estimated savings of $6 million. Various acid recovery companies were contacted and have provided preliminary system designs in the range of $2.5 to $3 million in capital costs.

Testing of the dissolved air flotation unit:
The site recently installed a dissolved air flotation system to remove BOD and metals from the water sent to the municipal treatment works. Zinc precipitation, coagulation and flocculation were studied by the intern and advice was given in the operation and optimization of the DAF performance.

Environmental recommendations:
General recommendations were suggested to plant personnel to create awareness of possible progressive environmental opportunities. A large quantity of clean water is a by-product of some rinse cycles. With the correct permits, this water could be directly discharged into a wetland, creating a new ecosystem on the property. Also, the City of Iowa City has implemented a new storm water tax for large industry, based upon the amount of impermeable surface area at the site. The concept of green roofs was explained and recommended as an excellent way to improve insulation, reduce runoff, eliminate storm water taxation, and most of all, make a huge statement about the plant's attitude toward the environment. Finally, bicycling to work was encouraged and a reward system for cycling was recommended.

Project Summary Table

Savings Project	Environmental Savings	Cost Savings	Status
Eliminate double billing on sewer	None	$150,000 + $30,000/year	Complete
Improve water recycling	10 million gallons/ year	$80,000/year	Recommended
HCl recovery	18.7 million kg HCl 6 million kg caustic 5 million gallon water	$6,000,000/year	Initial process research complete