Abstract: The cereal industry uses water in nearly every one of its processes. In doing such, waste is unavoidable. The waste water produced by Post is high in sugars, causing the Biochemical Oxygen Demand (BOD) of the water to be high. In a sense, this causes the treatment charges to be higher than necessary. This project would involve identifying areas where contaminants are leaking into the system, as well as identifying key strategies to reducing the amount of contaminants. Further analysis of the water would give a precise amount of total suspended solids (TSS) and BOD increasing agents in the flow, as well as where these solids are impeding the overall flow of the system. This flow will then be run through a reverse osmosis system, which will improve the overall quality of the water and reduce water treatment costs.

Project Objectives:
1. Identify areas of highest water usage
2. Measure BOD and TSS content of water at various points during processing
3. Implement a reverse osmosis (RO) system in the plant, lowering the cost of waste water treatment.

Project Information Overview:
- The current water treatment cost for Post is on average, $21,687.75 per month for BOD, and $4,492.17 for TSS.
- Yearly cost of the operation is $314,159.00
- These charges are for levels of BOD and TSS being above the allowed amount when the waste water is sent off site.
- The average monthly flow of the system is 6.467 million gallons.

Problem: Due to the high sugar content, and the high presence of cereal fines in the waste water coming from Post, surcharges have been added to their sewer bill. The most efficient way to lower this monthly cost is to improve the quality of the water on site, before it is removed for treatment. The method of treatment suggested is the reverse osmosis method of filtration.

Current On-site water treatment and filtration systems:

**Whirl Wet Dust Collector:** This system of pollutant removal is currently implemented at Post. The system is fully encased, making it ideal for a food preparation process. The fully internal system mixes the particle filled air with water, while a rotation action forces the particles to the bottom of the machine for collection.

**Hydro-sieves:** The hydro-sieve is used to filter out sediment from the effluent flow. The system works well for cereal fines, but allows the sugars to pass through, raising the BOD content of the waste water.

**Cyclone Filter:** The cyclone filter works in much the same was as the Tri-Mer system. Fluid is pumped into the system, where rotation causes the effluent to fall to the bottom of the tank.

Proposed System Modifications:

**Reverse Osmosis Filtration:** The system is fairly simple in it’s design. Effluent filled water is forced through a permeable membrane, leaving the effluent behind. This contaminated water is then flushed out of the system.

Benefit of Reverse Osmosis: If this system were added to the waste water removal process at Post, the sugar content in the waste water would decrease. This would cause a lowering of the BOD of the water, and in turn, lower the cost of treatment.