Cutting Waste At Borden

Twelve years ago, the Borden Packaging and Industrial Products plant at Fremont, California, embarked on a waste reduction program that has been successful beyond expectation. The Fremont plant currently manufactures aqueous formaldehyde solutions in various grades. We also produced formaldehyde-based phenol (PF) resins, marketed primarily for use in fiberglass insulation, as well as urea (UF) resins and wax emulsions, which are used primarily by the particleboard industry.

Formaldehyde is produced from methanol in continuous process that operates 24 hours per day, seven days per week. UF and PF resins are manufactured in batch reactors with batch sizes ranging from 50 to 160,000 pounds, depending on type and sales volume. In 1992, combined, total production at the Fremont facility was 200 million pounds.

We launched our pollution prevention program in 1981 after an unacceptable level of waste—more that 200,000 gallons of resinous sludge—had accumulated in a wastewater evaporation pond over a three-year period. As a result of ongoing efforts, the plant now recycles all of it PF resin washwater. Moreover, it generates only a minimal amount of sludge, reducing solid PF resin waste by over 90 percent and virtually eliminating solid UF resin waste.

Our formaldehyde unit has been recycling all of its wastewater, including stormwater, since 1987. With a capacity of nearly 300,000 gallons, the plant's stormwater collection system captures runoff from all of the processing areas of the site for even the heaviest rain. This particular feature helped the plant win a water conservation award at the 1992 California Water Conference.

We achieved our reductions in waste by:

- Segregating UF and PF resin wastes and wastewaters. Our previous practice of mixing these incompatible resins in the waste stream increased sludge formation and made recycling harder.

- Modifying filter housings are cleaned. Using compressed air in the cleaning process helped us recover product that otherwise would have become waste.

- Modifying filter rinsing procedures. By introducing a new two-
step rinsing process and recycling the concentrated first rinse, we were able to reduce the amount of wastewater as well as the amount of resin lost to the waste water stream.

- Retraining plant personnel to make them more conscious of waste reduction opportunities and including waste-reduction goals in employee incentive programs.

- Tracking waste generation and the resin concentration in washwater.

- Changing formulations that tend to form excess particulates.

This last step was particularly important because the resin business is dynamic and competitive, requiring continued performance improvements. The formulation modification were initially prompted by a customer complaint about excessive particles in a resin shipment. In addition, we were unpleasantly surprised to find excessive amounts of waste on opening resin tanks for cleaning.

Last year, Borden formed a team to look at the UF resin manufacturing process from beginning to end. The team was charged with reducing the amount of particulate in existing resins and also developing ways to anticipate problems early on, the objective being to decrease particulate formation in the first place.

As a result, a number of changes were made in manufacturing, storage, and handling procedures that enabled early detection of particulate formation. Tank cleaning now yields only two to three gallons of waste as compared to the two to three drums that were common in the past. The changes also eliminated those surprise instances when a tank yielded as much as 10 to 15 drums of sludge.

With solid waste from UF resin manufacturing virtually eliminated, the plant is now seeking to reduce the number of cartridges needed to filter new products being manufactured. Also, we have set a goal of zero wastewater discharge. We have not yet been able to find a way to recycle 2,000 gallons of water sent each day for treatment from reactor rinsing and returnable tote bin cleaning associated with UF resin manufacture, but we are vigorously pursuing a suitable recycling solution. At Borden's Fremont plant, pollution prevention is a task that is never quite
finished.

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