



On-Site Wastewater Treatment Working for Ohio Plastics Recycler

The common problem of successfully treating multiple and variable wastewater streams in-house in the plastics recycling industry is being met head-on by Evergreen Plastics, LLC, of Clyde, Ohio. In their PET bottle operation, where the wash line produces a stream that is significantly more caustic than the rinse line, the challenge is fairly universal: to maintain treatment quality and minimize operator time requirements. As Evergreen has found with a system developed by Beckart Environmental, the technological and chemical solutions for wastewater of this nature are well in place.

Evergreen is a subsidiary of PolyChem Corp., which produces plastic strapping for the packaging industry, and was launched in 1998 primarily to supply recycled material for PolyChem products. At about 52 million pounds per year currently, Evergreen has become one of the larger privately held recyclers of polyester in the U.S., and now serves markets from strapping to bottling.

With PET bottle grinding and other process equipment largely designed and engineered in-house, Evergreen produced approximately 18 million lbs. of recycled plastic during the company's first year, the majority of which found its end use in strapping products. By the year 2000, with the technology perfected, that output had increased to 32 million lbs.

As the company's volume increased, water use in the wash line also increased. One of Evergreen's first resource management challenges was to install additional equipment on the final wash line, which lowered total water consumption by about 30%.

GROWTH TESTS RESOURCES

Bringing in more water to support business growth was never a complicated matter. By the turn of the millenium, however, what was clearly becoming an issue was a wastewater stream that began to strain the capacity of the local publicly operated treatment works (POTW). With the stream consisting primarily of paper pulp and polyethylene from labels -- as well as adhesive residue and detergent generated in the wash line -- off-site wastewater treatment was becoming prohibitively expensive due to potential POTW surcharges, if not infeasible altogether.

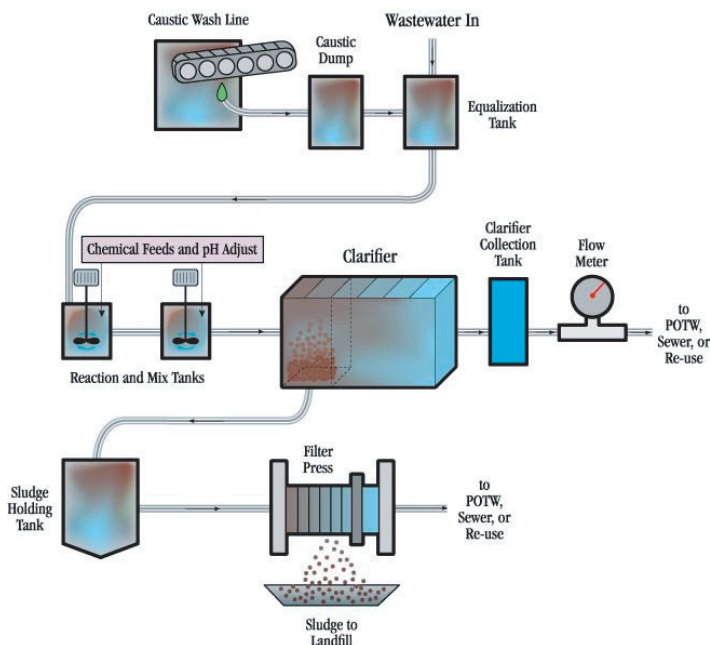
"As we researched the treatment system, we learned that there are typically two possible approaches," says Mark Jeckerling, Evergreen's assistant general manager. "You can cause the solids to rise in a flotation system, or sink in a sedimentation system. Either one might have done the job for us, but we decided to go with a Beckart DAF system. Though they manufacture both types, they were the only company we talked to that strongly recommended dissolved air flotation over sedimentation. Later, we learned from others treating the same type of water that their sedimentation systems required add-on equipment to process the water properly."

The new system was installed in July, 2000. Though this was the Beckart's first installation in a plastics recycling operation, the company has had broad experience in other industries targeting the same contaminants: label glue in the adhesives industry, color removal in the ink and paint industries, and paper in the pulp industry.

"Not having known much about wastewater treatment going in," Jeckerling adds, "we were interested in a user-friendly system from an experienced treatment equipment manufacturer. So things like good service, commercially available components, and well-thought-out visual indicators were especially important in our choice of suppliers. For anyone looking into wastewater treatment systems, I'd also recommend working with a supplier who will take the time to learn your operation and longer-range goals, so that equipment can be sized and laid out appropriately. Our system is sometimes handling larger flows than even we expected."

SURCHARGES AT A FRACTION

Among other contaminants, the Beckart system targets Total Suspended Solids, which typically comprise the bulk of treatable waste generated by plastics recycling operations and are among the surchargeable categories monitored by local POTWs.



Evergreen's polyethylene recycling processes essentially give rise to two separate waste streams: one containing all rinse water and which is held in an equalization tank, and a second stream containing highly caustic water which is collected in a caustic dump tank. Beckart engineers programmed the system to slowly meter the caustic stream to the EQ tank, which allows the water to balance out before proceeding through the treatment cycle.

The treatment process involves a chemical-physical approach in two reaction and mix tanks to break emulsions and cause the solids to form a floc and float to the surface. Designed to make all its own chemical, staging, and cycling decisions, the system features a programmable logic controller (PLC) with running light schematic to provide continuous information on system status. In a 30 gallon-per-minute clarifier, the solids are removed from the surface by skimmer boards, leaving clear water below that is pumped to a clean water tank. The segregated solids, meanwhile, are transferred to a filter press, where they are compressed to a dry, landfillable cake.

Back in 2000, Evergreen had projected that total surcharge costs would be \$15,000 monthly within a few years if they did not install a treatment system. Instead, the effect of TSS compliance alone can now be equated to savings of more than \$12,000 monthly, monies which find their way in part into the company's on-going programs to further develop methods and equipment for conserving, recycling, and reusing process water. The local POTW has worked with Evergreen as the company aimed for residential limits of 200mg/l for TSS, a level currently met on a consistent basis.

In addition to the cooperation and resources of the local POTW, Evergreen has been supported by grants from the Ohio Department of Natural Resources, Division of Recycling and Litter Prevention.

"It really does take the partnering of customers, suppliers, and government to achieve the benefits," says Jeckerling. "We want to take the lead in the whole area of resource use and reuse within our industry. Right now, our goal is to recycle 50-80% of the treated water. It's a challenge, but three years ago we didn't know that it doesn't have to be that complicated. . . that we could do things ourselves and save a lot in the process."