

Tennessee Pollution Prevention Partnership Success Story



JTEKT Automotive Tennessee-Vonore Co.
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Performer Recycles Machining Fluids

The Member

JTEKT Automotive Tennessee-Vonore Co. has been in operation in Vonore, TN since 1989. The 375,000 sq. ft. facility employs 544 employees and is located on property adjoining Tellico Lake. JTEKT produces over 1.2 million rack and pinion steering systems and 2.6 million high-pressure hose assemblies per year for original equipment vehicle manufacturers. JTEKT is a member of the Tennessee Pollution Prevention Partnership at the Performer level and is a corporate sponsor of Keep Monroe County Beautiful. JTEKT is ISO 14001:2004 certified and has a very positive attitude toward environmental management and protecting the environment. JTEKT is committed to reducing and/or eliminating waste to landfills by investigating and categorizing all waste materials generated at the facility.

The Story – Recycling of Fluids

JTEKT's manufacturing process involves the use of water based and synthetic coolants as well as various straight oils. In addition, JTEKT generated 'dirty' mop waste water through the following: equipment cleanouts, daily 5S, and use of floor scrubbers.

JTEKT wanted to improve the current recycling of water soluble fluid and begin the process of recycling the synthetic fluid and straight oils. An additional goal involved the reduction of oily waste water haul-off. Current oil soluble coolant recycling was minimal at best due to outdated equipment. In the past, most fluids had typically been shipped off site as oily waste water and oil. The decision was made to purchase technology involving a Centrifuge and Ultrafiltration. This would require redesign and new plumbing of the existing environmental room to allow installation of five additional tanks of various sizes.

New Idea

Each fluid type is collected and stored in individual tanks in preparation of the Centrifuge process area. This allows the Centrifuge to process the fluids in batches. Each tank has its own set of hoses running to the Centrifuge which allow for change over. Fluids go through the process to remove fines, free oil and particulates generated through the machining of parts. Particles smaller than 100 micron are captured, removed and disposed of during this process. Also, free oils are separated from water based fluids and plumbed to an oil holding tank for future oil recovery.

The Ultrafiltration system is used in conjunction with the Centrifuge in purifying 'dirty' mop water. After the mop water has been through the Centrifuge, it is stored in a holding tank prior to entering the Ultrafiltration or UF system. The UF is capable of separation of particles greater in size than a water molecule (or .00029 microns). During the UF process, the chemical bond in the dirty water is broken and UF effluent fluid is able to be reused at this point.

Initial trials of the Effluent were investigated to allow fluid to be reused. Virgin or new floor soap chemical was added to ensure effective cleaning could occur and the new recycled floor soap was ready to be used. Initially 25% of the recycled Effluent was used in this manner. Uses include the floor scrubber, general 5S purposes and mopping/vacuuming of the floor at the end of production day. At this point, the used fluid is collected as 'dirty' mop water and the process starts over.

After six months of trials and a reduction of 40% production due to an unfortunate downturn in the economy, it was determined ineffective to reuse the Effluent in the makeup of floor soap. Currently, the Effluent is sent out for disposal as waste water with a local recycler. Additional testing, equipment and chemicals are necessary to achieve the goal of zero wastewater haul off.

The Success

The cost avoidance of sending off dirty mop water totaled \$184,000. Over 6,800 gallons of straight oils were recycled and were able to be reused with a savings of \$55,000. Once the oils were no longer suitable for production use, JTEKT was able to sell the oil to a local recycler and generate \$5,200 profit. The cost disposal avoidance totaled \$5,800. Water based coolants were recycled and greatly reduced the need for virgin concentrated chemicals saving the company \$210,000 in new chemical purchases of 18,000 gallons. In addition, recycling reduced the need for fresh water purchases of 185,000 gallons.

Pollution Prevented

This environmental improvement activity will further reduce JTEKT's need for virgin concentrated chemicals through reuse and recycling. Fresh water requirements were reduced, and a 44% reduction in waste water haul off occurred. Better and more efficient recycling was accomplished through the use of new and better technology involved in the Centrifuge and Ultrafiltration process.

Future Activities

Future opportunities for landfill reduction will be available as new production lines are introduced in early 2010. These lines will bring additional waste streams and present a new opportunity for employees to become more involved in landfill reduction. Other projects include investigation by the chemical management group to change oil based fluids used in machining processes to water based coolants. This would allow for cost reductions and 5S improvement opportunities.