PUBLIC WORKS

Macerators reduce waste processing costs

Early in 1995, Las Vegas was faced with constant maintenance problems at its 66-mgd water pollution control facility (WPCF). Macerators that had been used for several years were unreliable and incapable of preventing clogging in components such as heat exchangers, pumps, valves, pipelines and centrifuges.

The Las Vegas WPCF employs a conventional activated sludge process that produces a final treated effluent that is consistently below the permitted limits for both BOD and suspended solids, which are discharged into Lake Mead via the Las Vegas Wash. The facility, which is staffed 24 hours a day, seven days a week, operates eight anaerobic digesters that incorporate a continuous recirculation system. Digested sludge is drawn off the digester bottom through a macerator, recirculation pump and hot heat exchanger and then returned back to its digester.

The heat inside the digester is maintained at about 98 degrees Fahrenheit. Sludge is continuously removed from the digesters for additional processing, gravity fed to one of the two 350,000-gallon holding tanks and then dewatered. After dewatering, the sludge is trucked to a landfill.

The original macerators were difficult to maintain because of the installation locations. Because of the grit and other material in the influent, Las Vegas officials soon encountered problems that required numerous labor hours for repair and equipment down time.

Large solids passed through the macerators and were transferred from the digester in the removed sludge. Those solids — especially pieces of plastic — in the removed sludge could easily pass through the system and cause major problems by throwing the centrifuge out of balance, thus causing excessive vibration and resulting in immediate equipment shutdown.

City officials decided to test a cutting type macerator made by Seepex, Enon, Ohio. The first macerator installed had just one cutter bar, a 10-hp motor, hardened tool steel shearplate and an operating range of 300 to 500 rpm.

In operation, the liquids/solids are drawn into the grinder chamber and shearplate by gravity flow and the sludge circulation pump. Solids pass through holes in the shearplate and are sliced by the rotating cutter assembly.

Las Vegas officials found that maintenance requirements have dropped sharply since installation of the macerators. Additionally, the plant no longer experiences the problem of centrifuge vibration precipitated by an "out of balance" condition caused by large solids. ☆

Newly installed macerators at the Las Vegas water pollution control facility have put a stop to the plugged heat exchangers, impellers and pipelines that used to plague the facility. Consequently, maintenance costs and equipment down time have been reduced.