

Application Profile

Lift Station Retrofit slashes energy cost by replacing Eddy Current clutch with AC Drive

The city of Rock Hill, SC is using the latest Parker variable speed drive technology to reduce energy consumption and to provide a reliable alternative to obsolete technology in its wastewater treatment plants.

The city's Wildcat Lift Station was constructed in the 1970's to help accommodate a rapidly growing population, and includes three 200 HP centrifugal pumps, driven by standard AC induction motors. The capacity of this particular



facility is 11 million gallons per day, and a 143 foot lift is accomplished by a sequenced combination of pumps. Pump flow was controlled by an eddy current clutch from the original installation. When Maintenance Superintendent Jon White had to deal with the



failure of one of the pumps' drive systems, he found that the repair cost was exorbitant and anything but expedient. Mr. White made the call to Parker territory manager John Stevenson, to update rather than channel any more funds into last generation equipment.

The inefficient eddy current clutch was removed, and the



existing 200 HP, 460 volt, 447T-frame motor was directly coupled to the pump shaft, requiring only a simple motor mount modification. The 200 HP AC890PX was then powered up through the existing control panel and pump sequencing logic. The

available bottom power entry configuration on the AC890PX made for a clean installation with no visible wiring. No expensive external harmonic filter was required, as the AC890PX includes a 3% line reactor, built into its enclosure, as well as line fuses and a local power disconnect switch with door interlock and lockable handle.



Replacing the existing speed control device with a solid state drive provides several tangible benefits to the city of Rock Hill SC. The obvious one is energy efficiency. Eddy current clutches rely on slip to adjust the speed of their load, and dissipate energy wastefully as heat. Their efficiency drops off significantly with speed. For example, at 60% speed, one could expect less than 60% efficiency... and with a 200 HP motor, this will really add up over time. On the other hand, by using an adjustable speed drive like the AC890PX to regulate the speed of the pump directly, there is no energy lost to slippage, and the current draw of the motor declines dramatically with reduction of speed. With a centrifugal pump, simply

reducing the speed to 80% will result in nearly a 50% decrease in power consumption. After three months of operation, the annualized energy cost savings is estimated at **\$18,000 per year**.

In addition to better energy efficiency from the drive as opposed to the heat-generating losses in the eddy current clutch, the 200 HP motor is now gently ramped up to speed with current limited by the drive. The old system started the motor across the line, resulting in a floor-shaking jolt and a high peak demand of current. Not only was this rough on the motor, but also on the power bill, as utilities meter their customers' peak demands and penalizes them with

surcharges based on their occurrence.

Yet another benefit of the AC890PX drive in a critical application is its reliability and reduction of down time. While the AC890PX uses highly reliable parts and passes rigorous factory testing, the possibility of a component failure does exist. Fortunately if this were to occur, the converter module, phase modules, and capacitor module are quickly removable and lightweight. Replacement of a module does not require a factory service person, nor does it require the return of the drive to the factory for servicing. In a matter of minutes, any of the modules can be replaced, and the drive brought back on line.



Parker Hannifin Corporation
SSD Drives Division
9225 Forsyth Park Dr.
Charlotte, NC 28273
Tel: 704 588-3246
www.ssddrives.com
Email: info.us.ssd@parker.com

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