



application of note

Clermont, Fla. Upgrades WWT Facility

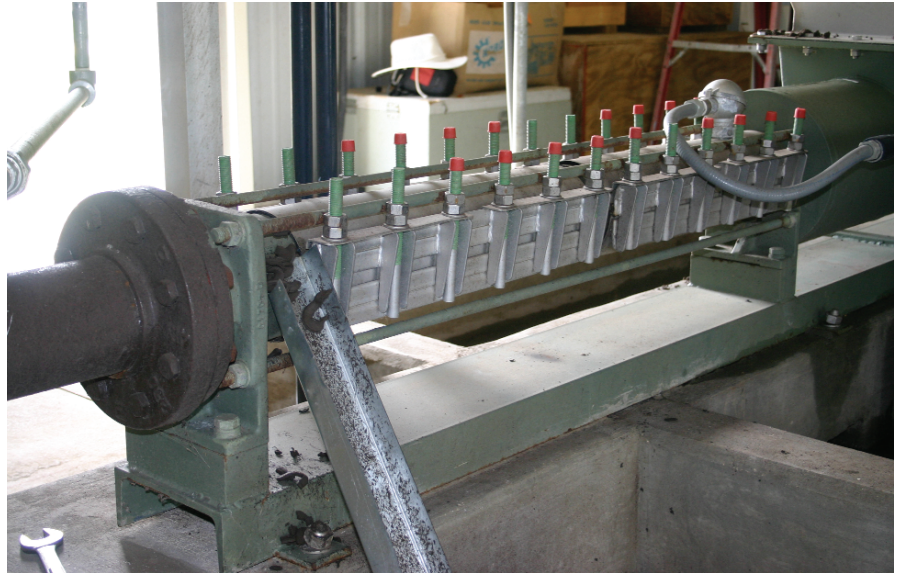
PC Pumps Play Key Role in Zero Discharge WWT Facility Upgrade

Early in 2000, Clermont FL began plans to expand their present wastewater treatment system, which was close to maximized output at a capacity of 750,000 gallons per day (gpd). Based upon projected population growth, management recognized that plans would have to include several subsequent expansions. They agreed that the operation, located in the midst of the population it served, should be pollution- and odor-free, a zero discharge facility, an asset to the community it was serving.

The upgrade was to include the addition of aeration and digesting tanks, plus a new sludge dewatering building with belt filter press. But, during the planning process, James Kinzler, Assistant Utilities Director, City of Clermont, Bob Reed, Operations Supervisor, City of Clermont, and James Kilgore, Chief Operator, City of Clermont East Water Reclamation Facility, with other members of the design team, anticipated two possible fluids handling problems. They wanted to avoid the expensive and labor-intensive prospect of trucking liquid digested sludge from the digesting tanks over a considerable distance to the dewatering building, and they wanted to avoid a high maintenance and messy open conveyor or belt system for moving sludge cake from belt press to containers within the dewatering building.

During planning, management consulted MTS, a local environmental fluids handling firm. They recommended two seepex progressive cavity (pc) pumps for the digested sludge and the high solids cake.

In operation, a progressing cavity pump's external helix rotor turns within an elastomeric double internal helix stator to form cavities that progress from the suction side to the discharge end of the pump. The continuous seal between the rotor and stator helices moves the fluid steadily, without valves or pulsations, at a fixed flow rate proportional to the rotational speed of the pump and independent of pressure fluctuations



The pump stator is fitted with a retensioning device that allows the compression between the rotor and stator to be adjusted for wear. Unlike other designs, it evenly applies pressure to the entire circumference of the contact area. If properly used, it typically increases the life of the stator by up to 2-3 times.

that can result from varying densities of conveyed product.

Problem-Solvers

For the digested sludge, comprised of 1.4 % solids with abrasive particulates, seepex personnel recommended a BN 70-6L block pump, equipped with a TSE dry run protection device, a Therbar® slotted stator with retensioning device, and Duktil® coated stainless steel rotor. The seepex block pump, especially suited for varying flow rates, is rated for up to 150 USgpm. The close-coupled design requires a small footprint, and offers simple maintenance since the pump can be entirely disassembled from the pump discharge end (though to date no maintenance has been required). The 6-L pump geometry allows reduced thrust load on the drive train, resulting in longer life for the universal joint and bearings and greater volumetric efficiency with reduced erosion rates than with conventional geometry.

For the high solids dewatered cake, seepex recommended a type BTE 17-24 open hopper pump with customized hopper and ribbon auger feed screw to enhance product feed. The pump, situated directly below the

discharge of the press, is rated for up to 24 USgpm. It is also equipped with TSE dry run protection, a slotted Therbar® stator with stator retensioning device, and Duktil® coated stainless steel rotor. A sensor monitors cake levels and adjusts the speed accordingly.

Results

The city's expanded facility opened in 2002. It currently handles 2 mgd of incoming wastewater, serving a population of 13,000. The picturesque 45-acre grounds blend in seamlessly with their surroundings: a school, a residential development, a large park and a golf course.

Now, when screened and degrittled sewage enters the Clermont plant, odorous vapors are immediately captured, lifted out by fans into a waiting mulch bed. Aerated basins receive the wastewater, where vigorous aeration gives the waiting bacteria time to 'eat' organic content. The water remains in these bubbling tanks for a detention period of approximately 12 hours. Thereafter, it enters clarification tanks, where oily matter is skimmed from the top, activated sludge sinks to the bottom, and the clarified water is removed for eventual non-potable re-use.



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Bacterial activity is enhanced by reintroducing some of the settled, activated sludge from the clarification tanks back to the beginning of the process, reducing the cost of adding bacteria to the cycle. Periodically, some of this recirculating sludge is 'wasted' from the cycle to the digesting tanks where it will spend approximately 28 days to stabilize, during which time staff carefully monitors oxygen levels to ensure healthy bacterial activity. The plant relies entirely on bacteria, no added chemicals, for the sludge digestion process.

The seepex BN pump moves stabilized sludge from the digestion tanks through 1500 ft. of underground piping to the gravity belt press facility. The seepex BTE pump moves the high solids dewatered sludge cake through three separate, closed overhead pipes, which can be opened or closed for even load distribution, for discharge into a waiting trailer. This container holds 25 cubic yards of cake and takes about 8 hours


to fill. At this point, the cake is hauled away to be further processed for use as commercial fertilizer. "These biosolids are completely odor free, so thorough is the sludge digestion process," notes Bob Reed.

The re-use water resulting from clarification tanks and gravity belt run-off is diverted for filtering and chlorination. Some of the re-use water is consumed by the plant. About 85 % is sold to surrounding golf courses for irrigation. Eventually, neighboring residential areas will also purchase re-use water from the operation for lawn watering, since Clermont residences are triple piped for potable water, sewage, and re-use water. Meantime, when the plant has an overage of reuse water on hand, they pump it to one of several percolation beds through which the water will filter slowly through the ground to wells 900 ft. beneath the facility.

Management reports that their seepex pc pumps have performed beyond their

expectations. The pumps operated a full three years before a single replacement part (a stator) was needed on a cake pump. Reed reported that the repair took place in no time, with no interruption to plant operation, and with minimal manpower and cost.

Future

The City of Clermont presently anticipates another WWTP expansion whose upgrades will include a second filter press, with seepex pc cake pump, alongside the first installation. Reed notes that the present facility has enough space for even further upgrades, with the ultimate capacity projected at 6 mgd. He expects seepex pumps to be a part of each expansion. 

For additional information, contact sales@seepex.net or log on to www.seepex.com.

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