The Challenge

Sludge contains high levels of entrained air and gas

High viscosity sludge

Reduce maintenance costs

The Discflo Solution

Discflo pump handles high viscosity fluids with ease

Discflo pumps up to 80% entrained air/gas

No downtime or repairs in two years since start-up

DISCFLO
Disc Pumps

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Case Study

Pumping Anaerobic Sludge

Metro Wastewater Reclamation District, Denver

The Metro Wastewater Reclamation District in Denver, Colorado, has solved a persistent pumping problem by installing Discflo pumps. These pumps are being used to handle a viscous anaerobic sludge containing high amounts of entrained gas, and have operated with no downtime or repairs, other than routine preventative maintenance, since start-up two years ago (in 1995).

The Metro Wastewater Reclamation District processes about 150 million gallons of wastewater a day at its 170-acre plant northeast of Denver, making it the largest wastewater treatment facility between the Mississippi River and the West Coast. Moreover, it has among the lowest costs for water treatment in the US, compared with organizations of similar size.

One of the by-products of the District's wastewater treatment is a bio-solid sludge, sold for use as fertilizer to the surrounding agricultural area. This sludge, which comes from the primary and secondary treatment of the wastewater, undergoes anaerobic digestion in 10 digesters at the Central Treatment Plant.

With a solids content of between 2% and 4.5% by weight, a viscosity in the range 1300-5000 SSU, and high amounts of entrained gas, it is a difficult material to pump. The entrained gas was a particular problem, according to staff engineer Sherman Papke. "Our mixing equipment caused air bubbles in the sludge, which over time would collect and form air pockets. The old pumps would air lock and quit pumping fluid," Papke explains.

In addition, the pumps must work continuously to pump sludge from the digester, through a spiral heat exchanger, and back into the digester. This recirculation process ensures a constant temperature of 98^0F is maintained in each digester. The loss of one of these pumps can result in a decrease in digester temperature, which upsets conditions in the digester and adversely affects sludge quality.

For 20 years, the District had used vertical centrifugal pumps to perform this recirculation task. However, the installed pumps were coming to the end of their life and required increasing levels of maintenance to operate effectively. In addition, the manufacturer no longer made that particular model of pump, so spare parts were difficult to obtain.

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The District then looked at Discflo pumps. After field testing a disc pump and talking to other wastewater plants that had installed disc pumps, the District decided to employ them in sludge recirculation. The initial order was for four Discflo pumps of 500 GPM capacity, one each at four of the ten anaerobic digesters at the Central Treatment Plant. They were put into service between February and June 1995.

One of the major factors in selecting these pumps was their ability to pump sludge that contained high amounts of entrained air. The Discflo pump is able to do this by virtually eliminating contact between the pump's moving parts and the fluid being pumped. So during pumping, the air and gas bubbles remain entrained in the fluid, rather than gathering in the eye of the pump and air-locking the system. Tests of the Discflo pumps in other industries have shown that fluids containing up to 80% air/gas entrainment can be pumped.

The District has experienced no operational or maintenance problems related to these pumps and no downtime other than routine preventative maintenance in the two years since they were put into service. There was a minor problem with one mechanical seal but this was supplied by an outside manufacturer and not related to the Discflo pump itself. All four pumps have run virtually continuously since start-up, and have been operating at or above the expected performance rating.

"It is difficult to find fault in a pump that runs strong, delivers the flow you are expecting and requires little or no maintenance" comments Sherman Papke, Project Manager at the District's Central Treatment Plant. "We anticipate these trends to continue and look forward to these pumps performing well for many years."

Based on the initial success of the pump, the District plans to purchase six more Discflo pumps in the coming year, to be installed by the end of August 1997. They will replace the remaining sludge recirculation pumps at the other six digesters at the Central Treatment Plant, and will handle the same material as the Discflo pumps currently installed.

Call Discflo now to find out how our pumps can solve your problems.

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