

Sonoma County Improves Sludge Handling with NETZSCH Sludge Cake Pump Technology



Sonoma County Water Agency turned to NETZSCH for the difficult task of conveying dewatered sludge cake.

California's Sonoma County Water Agency (SCWA) provides wastewater collection, treatment, recycled water distribution and disposal services for approximately 30,000 residences and businesses in Sonoma County, California. SCWA operates and manages eight sanitation districts and zones. The SCWA is also responsible for provision of naturally filtered drinking water, as well as flood protection services.

The sludge dewatering equipment at the SCWA's Sonoma Valley County Sanitation District (District) wastewater treatment facility was old and outdated, and it was decided that it would be replaced with a screw press as part of a larger facility upgrade.

In the initial phase of their facility upgrade, the District purchased three NEMO® BY progressing cavity pumps to feed the existing dewatering belt filter press. After dewatering the sludge load, a conveyor is used to move the dewatered sludge. It was then loaded into trailers and trucked to a land application site. After installing the NETZSCH progressing cavity pumps in 2010, the District continued with its plans to transition to a screw press for sludge dewatering. SCWA's goal was to use a pump, rather than a conveyor, to transfer the dewatering press sludge from the screw press to the truck loading station.

The District had several issues with the existing conveyor system. The first issue is the difficulty in moving the sludge cake to more than one location. Trailers are 30 or 40 feet



NEMO® BY progressing cavity pumps for belt filter press feed.

long and the sludge must be evenly loaded in each trailer. Because the conveyor moves the sludge to only one point in the trailer, employees had to manually distribute the sludge to fill the trailer evenly. With a pump, sludge could be piped to multiple locations via a system of valves to fill the trailer evenly.

A second concern is that a conveyor is open and moves the sludge on a belt, resulting in spillage and odor, whereas a pump would be totally enclosed in a pipe, eliminating both issues.

A third factor is maintenance. All conveyor devices have relatively high maintenance costs for routine replacement of belts, screws, bearings and drives. The costs increase when long distances must be covered and when the conveyor has to turn a corner or change direction; for example, each change in direction requires a new motor.

By contrast, only one drive is required for a sludge cake pump which does all the work. There are no more belt or conveyor component replacements, fewer bearings, and fewer motors, so maintenance costs tend to be lower. Typically, if the distance is longer than 50 feet, or if there is a need to turn corners or go to multiple points, using the pump is more cost effective.

SCWA looks to NETZSCH for a progressing cavity pump solution

After considering these issues, the District selected progressing cavity pumps as the preferred option for transporting the sludge cake. Working with local pump distributor Flo-Line Technology, the District sought to take advantage of NETZSCH's



Even distribution of sludge into trailer

sludge cake pumping expertise with NEMO® progressing cavity pumps. John Albrecht of SCWA noted that he had originally viewed a range of NETZSCH sludge cake handling pumps at a WEFTEC conference; NETZSCH pump experts later toured the Sonoma Valley plant and suggested that these pumps would indeed be an excellent fit for their new screw press system.

NETZSCH and Flo-Line worked with the District and its consulting engineers to provide technical and budgetary information for the sludge cake pumping system. They went through several iterations to refine requirements.

The District then conducted a competitive bidding process as part of the general contract for the solids handling project.

The specifications were written to provide ideal performance in terms of cake sludge solids percentage, pumping pressure, and a variety of other design criteria.

After considering several bids, the District ultimately selected the NEMO® SF Sludge Cake Progressing Cavity Pumps. The pump's enlarged housing has a fully customizable rectangular hopper and force feed chamber for easier entry of the product into the rotor and stator. The coupling rod incorporates a patented positioned feed screw that extends over the joints and is always positioned opposite the open cavity of the stator. This pushes the sludge cake directly into the open cavity in the shortest possible route. It improves the chamber filling by up to 50 percent as compared to other pc pumps with random positioning of the screw.

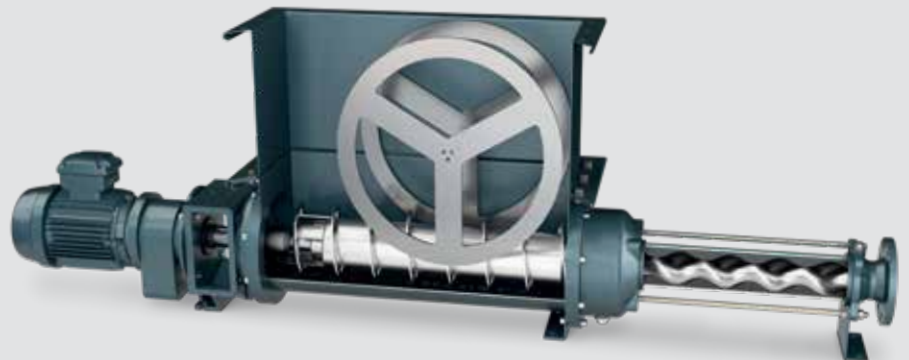
Also included was an asynchronous bridge prevention (aBP) module to prevent sludge “bridging” in the chute below the screw press, which could then block the inlet to the pump. Bridging occurs when thick and dry dewatered sludge cakes together. If sticky enough, it can build up on the walls of the chute and then actually “bridge” over the top of the auger in the pump, stick to itself, and not drop down with gravity into the pump.

The aBP-Module® consists of two flat spoked wheels, one on each long side of the chute. It has its own small (1/4-HP) motor, which turns very slowly. The module essentially creates a moving wall in the chute, preventing the material from building up on the walls, because the flat large diameter wheels turn very slowly at slightly different speeds from one another. Installation of the aBP allowed the sludge cake pump to handle even the stickiest, most bridge-prone sludge.

The equipment was delivered and the installation was completed, with facility



District ultimately selected the NEMO® SF Sludge Cake Progressing Cavity Pump



NEMO® Sludge Cake Progressing Cavity Pump with aBP-Module®

Pump Data

Pump type:	NEMO® PCP Model NM076 SF04
Capacity:	10 to 15 gpm / 2.2 to 3.4 m³/h
Pressure:	180 to 220 psi / 12 to 15 bar
Pipe Length:	55 feet / 17 meters
Pipe Diameter:	6"
Medium:	Dewatered sludge cake 22% DS

startup in the January of 2014. NETZSCH provided the pump to the contractor, FKC Company Ltd, who provided the screw press, and the contractor installed all the equipment, all the piping work, and the building construction. Flo-Line Technology assisted with the development, design, commissioning, and system optimization, offering a turnkey solution to the client.

After operations began, Sonoma County Water Agency experienced a significantly

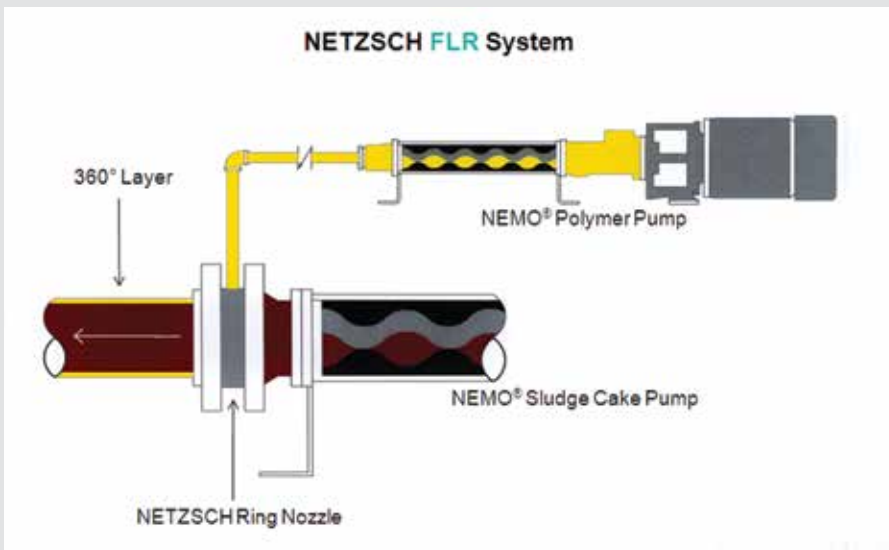
high pressure drop, which resulted in some difficulty pumping the muddy dirt-like material through the very long spans to the trailers sitting side by side in the new sludge loading building. NETZSCH experts suggested changing the pipe elbows used for changing direction from a tight bend to long sweep elbows, thus reducing significant pressure losses in the elbows. Additionally, Flo-Line Technology recommended adding the NETZSCH friction loss



Polymer injection - NETZSCH FLR system reduces friction losses

reduction (FLR) system, which consists of a small NEMO® progressing cavity pump that injects a layer of polymer along the inner diameter of the pipe which allows the sludge to move more easily.

These renovations allowed the District to achieve considerable reductions in pressure, cutting back on operating costs and improving system lifetime. As a result of these changes, the pressure experienced at the valve farthest away from the pump is now 220 psi. Previously the pressure was 360 psi which is roughly one third drop in pressure loss which is now in line with the original design considerations.



NETZSCH Friction Loss Reduction system

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