

SOLIDS HANDLING

By Glenn Curtis

Belt Filter Presses: Still a Cost-Effective Solution

Myth *or* Reality?

Department of Environmental Services (DES) of Monroe County, N.Y., operates two wastewater treatment facilities (WWTFs), both located on the southern shore of Lake Ontario. Until recently, belt filter presses were used at both facilities for biosolid dewatering. In 1995, DES was faced with a choice to either upgrade its belt filter presses or look for alternative dewatering methods.

Plant, Collection System Background

The Northwest WWTF is a biological plant that serves a population of 150,000 in an area of 222 square miles. The plant has an average capacity of 22 million gallon per day (mgd) with a peak capacity of 45 mgd. Forty miles of interceptor sewers and three major pump stations feed the plant. The facility's biosolid handling system consists of 2 two-meter belt presses.

The VanLare WWTF was built in 1916 and is the largest treatment facility in the county. The facility serves the Irondequoit Bay, Gates-Chili-Ogden and Rochester Pure Waters' districts. The plant serves an estimated population of 536,000 in an area of 295 square miles. VanLare's operating permit for flow is 135 mgd (100 mgd average dry weather flow). The plant is hydraulically capable of handling 660 mgd during storm events with 225 mgd receiving conventional (secondary) treatment. The sewerage is conveyed by either combined surface

collection and/or a deep rock tunnel system. The tunnels were constructed over an 18-year period ending in 1993 to convey storm event flow and prevent combined sewer overflow events.

Since VanLare's solids handling system was the oldest, it was the first to be studied for alternatives.

Options

VanLare's solid handling system consisted of 10 two-meter continuous belt

In 1995, management investigated whether the replacement of belt presses with newer belt presses would be more cost-effective than going with a newer technology such as centrifuges. The first step was to get estimates from vendors on equipment purchases. Belt presses ranged between \$150,000 to \$180,000 each. Several centrifuge manufacturers were solicited and the cost estimates were \$550,000 each.

The next step was an analysis of the system's current needs as well as a look into the future. Issues facing the facility included increasing production while reducing the workweek, reducing odors generated with the process, and long-term cost effectiveness.

The Centrifuges

The replacement of 10 belt presses with three centrifuges processing the same volume seemed to be an attractive option to address these issues. A request for proposals (RFP) went out and the engineering firm of Malcolm Pirnie, Inc. was selected to start the design phase of the system.

Malcolm Pirnie incorporated a "team concept" into the design phase of the project. This concept involved including DES operators, mechanics, electricians and instrumentation people throughout the design process. This method brought many years of real-world operation and maintenance experience to the table. Overall, this concept gave the customer (the County of Monroe) exactly what was needed to move into the future.



presses and three multiple hearth incinerators. Four of the 10 belt presses were Parkson presses purchased in the early 1980s. Four additional Ashbrook presses were added in the mid-1980s and two final belt-dewatering presses were installed in the late 1980s.

The equipment was always on. A cost analysis was performed on the maintenance history of the belt presses and, in some cases, repair costs almost equaled replacement costs. The equipment had to be continually staffed and was getting old and worn out.

The treatment facility's solid handling system consisted of 10 two-meter continuous belt presses and three multiple hearth incinerators. ▶

The centrifuges and cake pumps were prepurchased by the County of Monroe to reduce construction time. The construction phase was bid out and awarded to Crane Hogan Structural Systems (general contractor), R.G. Burns Electrical (electrical contractor) and Crosby Brownlie, Inc. (HVAC). Construction involved the installation of three Model D7L Andritz-Ruthner, Inc., centrifuges, three Schwing cake pumps, four positive displacement sludge feed pumps and other ancillary equipment.

Construction began in June, 1998 and was completed one year later. In my years of experience, the construction phase was one of the more seamless transition projects we have encountered. Engineers and the general, mechanical and electrical contractors ironed out all construction issues and moved forward smoothly and quickly. The construction costs of the project are shown in Table 1.

Table 1: Construction Costs

The approximate \$6,831,000 cost of construction breaks down as follows.

General Construction.....	\$ 2,202,433
Plumbing.....	\$ 49,202
HVAC.....	\$ 503,000
Electrical.....	\$ 418,000
Engineering.....	\$ 1,345,000
Schwing Pumps.....	\$ 660,000
Andritz Centrifuges.....	\$ 1,500,000

Centrifuge Results

One of the first myths about centrifuges we encountered during the project's study phase was that their operating cost is higher than belt filter presses. In operation, this has not been observed. One centrifuge replaced three belt presses. Two of the centrifuges are in operation, while the third is a backup for production.

During the first six months of centrifuge operation, the County of Monroe

Construction involved the installation of three centrifuges, three cake pumps, four positive displacement sludge feed pumps and other ancillary equipment ▶



has achieved many of the goals set forward when the project originated. The polymer cost has decreased by \$62,726 despite the larger unit cost of emulsion polymer. Cost per ton during centrifuge operation is \$13.32 (down from \$21.70 during belt press operation). Solids handling by the centrifuges have increased the sludge solid content from 20 to 30 percent. This has saved the county \$307,722 in natural gas costs for incineration.

The workweek for solids handling has been reduced from a seven-day to a five-day operation. Overtime also has been reduced by 1,800 hours for the six-month period.

Odor generation was critical when the project started. A 1,500-cfm exhaust fan has replaced a 12,000-cfm blower to exhaust the odorous fumes from the cen-

trifuge operation into a sodium hypochlorite scrubber.

When comparing belt presses and centrifuges, it really comes down to the needs of the facility. In order to develop a true cost analysis, operation size and ancillary odor abatement concerns all are factors in the equation. The centrifuges have met our needs and exceeded our expectations. Since the project was so successful at our VanLare Facility the County is proceeding to install centrifuges at the Northwest Facility.

About the Author:

Glenn Curtis is the chief pollution control operator of the Monroe County Department of Environmental Service, N.Y. He has more than 28 years of experience.

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