



EPCOR's Sun City, Arizona, USA Screentec™ Automated Vertical-Bar Screen System, Designed Specifically for the Lift Station's Narrow and Deep Channel.

WASTEWATER TREATMENT PLANT OPERATORS, LIKE EPCOR WATER'S SUN CITY LIFT STATION IN ARIZONA, EMPLOY UNIQUE SOLUTIONS LIKE SCREENTEC™, TO AUTOMATICALLY REMOVE EFFLUENT DEBRIS FROM NARROW- AND DEEP-CHANNEL PUMP STATIONS.



MANAGING THE GROWING SURGE OF NON-DISPERSIBLE DEBRIS IMPACTING WASTEWATER PUMP STATIONS

By Patrick Roberts

Wet-wipe consumption overall has nearly tripled in the past decade, according to Smithers Pira (formerly Pira International), the worldwide authority on the packaging, paper and print industry supply chains. The appeal of these products comes from the advantages they offer consumers in effectiveness, cleanliness, convenience and ease of use. But these paper towels, baby wipes, diaper liners, feminine hygiene and cosmetic wipes, and cleaning cloths reach wastewater treatment plants (WWTP), and pump station manual bar racks and pumps relatively intact, clogging screens, jamming equipment, and increasing maintenance, repairs and operational costs. According to the Association of the Nonwoven Fabrics Industry (INDA), field tests conducted with wastewater utilities show that the wastewater system impact of non-dispersible debris breaks down to 50 percent paper towels, 25 percent baby wipes, and 25 percent feminine hygiene, household cleaning and cosmetic wipes. For decades, wastewater treatment plant operators have dealt with periodic plugs at their WWTPs and pump stations, but the meteoric rise in use of disposable wipes and other non-dispersible products has accelerated the problem to epidemic proportions in just about every developed municipality worldwide that relies upon a functioning wastewater treatment system.

Impact on Pump Stations

Being upstream from wastewater treatment plants, pump stations are the first wastewater treatment systems impacted by non-dispersible products. Upgrades made to pump stations have primarily

focused on pump replacement, leaving the original-equipment coarse bar screens intact. These screens, which may have been installed 30 to 40 years ago, with 2" to 2-1/2" openings, have most probably performed satisfactorily for decades, but now are inadequate at stopping the increased flow of non-dispersibles, which are pumped right through to the wastewater treatment plants. The headworks in too many WWTPs, however, also utilize coarse screening, allowing this material to negatively impact the operation of pumps and mixers - a costly result.

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But, because not all of these non-dispersible products make it through the pump stations, considerably more debris clean-out, maintenance and repair is needed to be performed at the lift stations. Draining the pipes and disposing of the waste plugging the lift stations is tedious and unsafe work within tight space constraints. Workers need to access lift stations 30 to 40 feet underground, wearing Tyvek suits, rubber gloves and safety glasses, then carry the waste material up flights of stairs for disposal in waste receptacles above ground - a labor-intensive and increasingly costly operation.

Additionally, to compensate for the higher concentrations of non-dispersible debris, many WWTP operators have needed to increase the horsepower capacity of their pumps in lift stations to maintain flow rates.

Challenge to Improve Sun City Lift Station Screening Performance

Reducing the impact on costly-to-maintain-and-replace

WWTP systems can be mitigated by better managing non-dispersible debris upstream at lift stations. An excellent example of how this can be achieved is the recent upgrade to the Sun City Lift Station in Arizona, owned and operated by EPCOR Water. "What we had in the Sun City Lift Station was very antiquated screening technology, installed in the late 1970s," said Douglas Griffith, Operations Manager with EPCOR Water. "The upstream coarse 2" screen was very inefficient, letting just about everything through that was smaller than a bed sheet or a towel. The screen was not designed to deal with a high volume of non-dispersibles that the lift station was experiencing.

Consequently, the pumps pushed most of this non-dispersible debris to the plant several miles away, where much of that ended up weaving itself into big masses of material that would jam the plant pumps and mixers. It was costly."

"Earlier, we had switched out our existing lift station pumps to larger 250 hp slurry pumps, which were much bigger than what we needed for the flow, but necessary to deal with the debris," continued Griffith. "This solved our flow rate problem, but the lift station was still passing on all of this debris to the plant."

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Not all of the non-dispersible debris passed through the lift station pumps. That which was trapped in the coarse screen needed to be cleaned out about every two weeks. This necessitated that two workers descent 30 feet underground through a narrow vertical passageway and physically remove the material, bringing it back to the surface.

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"Cleaning the lift station screen from debris was very awkward, and unsafe," expressed Griffith. "We were progressively having to do this more and more frequently. We definitely knew it was time for an upgrade."

A Better Solution to Manage Sun City's Non-Dispersible Debris

Most of the solutions that Griffith and his team examined for improving the screening performance of the Sun City Lift Station involved demolition and major excavation, with costs exceeding one million dollars.

"We were looking for a solution that was cost-effective," added Griffith. "And something that would fit into our narrow existing channel."

The system that EPCOR selected was Screentec™, from Aqualitec Corp., an automated vertical-bar screen system designed specifically for narrow- and deep-channel lift stations, headworks, wet wells and manholes. The screen has 1/2-inch openings, significantly smaller than Sun City's prior 2" coarse screen. All of the wastewater flow is diverted through the Screentec system, then back out again. The system effectively removes 75 percent of the debris material before it gets to the lift pumps.

"When I first saw a demonstration of the system, I could see that it would fit into the existing Sun City Lift Station channel," said Griffith. "That meant there would be no need for costly demolition or excavation. I also liked the fact that there were no bottom bearings, and that it utilized a strap instead of chains.

I would much rather maintain a strap than I would bearings, chains and the lubrication required."

Indeed, Screentec does not have any moving parts under grade level, providing easy and safe maintenance for the operational staff, and minimizing maintenance costs. An automatic rake system pulls the debris to the top, where a scraper puts it into a screw conveyor which then conveys it into a 20-cubic-yard dumpster. The debris from the lift station is filling one dumpster weekly.

"The more we can screen out upstream at the lift station, the less we have to deal with at the wastewater treatment facility," continued Griffith. "We stopped a lot of that material from meandering through the plant and ultimately taking out equipment. We also protected the pumps at the lift station, keeping any heavy debris from getting through. Every time a pump gets clog up it causes a wearing issue."

An added benefit, because of the greatly reduced debris flowing through the lift station pumps, EPCOR is now planning to downsize to much smaller 135 hp pumps, which will consume less electricity.

About the Author

Patrick Roberts is a freelance writer with extensive experience writing on water and wastewater systems and technology, for both industrial and municipal applications. His feature stories have appeared in scores of trade publications worldwide.

EPCOR Water is a utility company based in Edmonton, Alberta, which manages numerous municipal water and wastewater treatment facilities throughout Canada and the United States. The company is a division of EPCOR Utilities, Inc., which builds, owns and operates electrical transmission and distribution networks throughout Canada and the U.S. The company provides water and wastewater services to more than one million people in over 85 Western Canadian communities and industrial sites. It is also the largest private regulated water provider in Arizona and New Mexico, serving 22 communities and 7 counties.

Aqualitec Corp. is one of the fastest-growing U.S. distributors of wastewater equipment for municipal and industrial applications. Its product line includes a wide range of high quality, low maintenance, easy to install screening equipment, such as vertical bar screens, multiple-rake screens, drum screens, inclined cylindrical screens, static screens, conveyors/compactors, washer compactors, grit classifiers and motorized rotary brushes. Aqualitec Equipment is simply designed, yet extremely efficient, making it easy to fit and retrofit in any kind of structure with minimal changes. By using simple mechanisms, the equipment increases durability while decreasing maintenance costs. Its staff of specially trained experts employ the latest technology and equipment to help its clients meet their needs with reliable, simple and cost-efficient solutions.

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