Water & wastewater

Effective recovery of phosphorus from sidestreams

Many wastewater treatment plants experience issues with sidestream phosphorus recycling and trying to meet strict EPA requirements. Here, we see how the successful piloting operations of Renewable Nutrients' Quick Wash process could mean greater operational efficiency in removing and recovering phosphorus from sidestreams.

Renewable Nutrients announced the conclusion of successful piloting operations of its Quick Wash phosphorus extraction and recovery process at the Raleigh, NC and Greenville, NC wastewater treatment plants (WWTPs).

"Both the Greenville and Raleigh WWTPs expressed an interest in studying the efficiency of the Quick Wash process to reduce phosphorus loads in their respective waste streams," said Jeff Dawson, Renewable Nutrients' chief executive officer. "With our mobile pilot unit, transportation between the two treatment facilities and subsequent multi-day operations proved to be an easy evolution."

The pilot operations conducted at the two North Carolina WWTPs tested the effectiveness of extracting and recovering phosphorus from the sidestreams of solids dewatering operations. Many WWTPs throughout the US experience issues with sidestream recycling of phosphorus, which in many cases serves to return a significant amount of the phosphorus loads present in a facility's solid stream and ultimately impact its final effluent.

Inside the Quick Wash mobile pilot trailer.

Meeting stringent EPA requirements

"A standard operating procedure at many US wastewater treatment plants is to pull phosphorus out of a facility's liquid influent via a binding agent like iron or alum, or through employing a natural process like biological phosphorus removal (BPR)—or even a combination of the two methodologies," commented Larry Sandeen, chief technical officer at Renewable Nutrients.

"Both processes transfer the phosphorus from the liquid stream to the solid stream, and a significant percentage of this phosphorus releases into the sidestream (e.g. - centrifuge centrate or belt filter press filtrate) during typical dewatering processes. This phosphorus-laden filtrate is then redirected back to the plant's head works where it re-enters the WWTP process, effectively increasing the phosphorus loading that the plant

must treat, and often resulting in increased phosphorus discharges to the receiving waters.

"The current strategies used for control of phosphorus can be difficult to operate, increase the volume of biosolids generated and put a facility at risk of violating Environmental Protection Agency (EPA) requirements, which are becoming more stringent as Total Maximum Daily Load (TMDL) based permitting requirements are put in place to protect and restore impacted receiving waters," added Sandeen.

"We see the extraction and recovery of phosphorus at the sidestream of our dewatering presses as an economical and efficient solution to reducing our phosphorus loads," said Jason Manning, superintendent of the Greenville Utilities Commission Wastewater Treatment Plant. "A simple mass balance model shows us that by removing the phosphorus present in our sidestream, we can ultimately reduce the amount of phosphorus that must be treated by our plant.

"We think an added benefit will be to make our Biological Phosphorus Removal (BPR) process work much more effectively. We simply won't have to be concerned that we are over-saturating the microorganisms in our BPR with more phosphorus than they are capable of processing," added Manning. He continued, "I was impressed with the data and results that the Quick Wash pilot team provided, along with our own internal analysis of samples from their daily operations. The collective analysis demonstrated that the process could extract and capture nearly 100% of the total phosphorus from our sidestream."

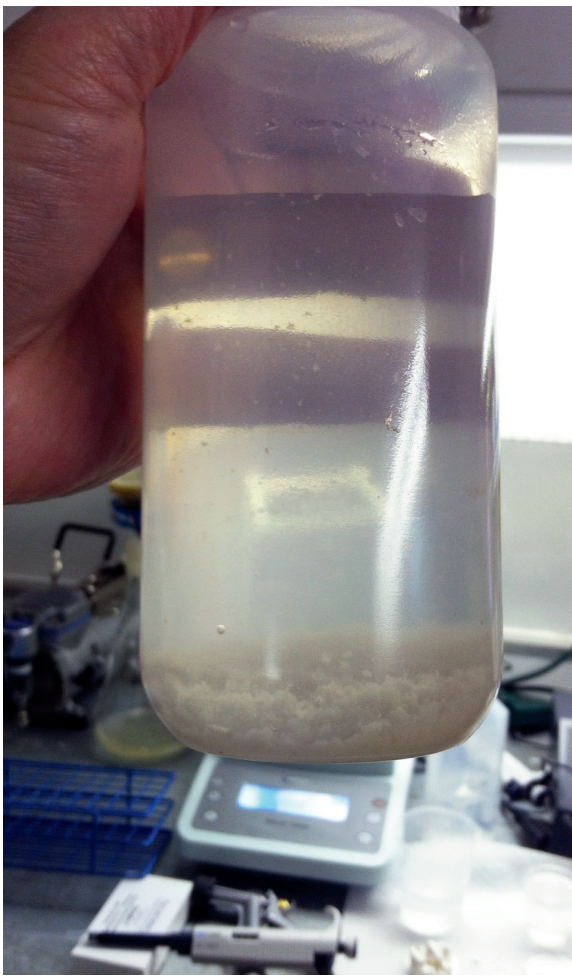
Greater operational efficiency

The Quick Wash process both extracts and recovers phosphorus from either the solid stream or the sidestream of a WWTP's operation. There are several key benefits to deploying Quick Wash, including the potential resale or monetizing of the recovered phosphorus. Quick Wash eliminates the need to introduce costly metals into a WWTP's influent for the purpose of binding phosphorus to its biosolids.

"I was impressed with the data and results that the Quick Wash pilot team provided."

This addition of metals is a practice that also serves to increase the mass of solids that must be dewatered and ultimately disposed, so another benefit of the Quick Wash process is that through reducing or eliminating metal salts, a facility can enjoy greater operational efficiency via a reduction in the volume of solids it must process.

Finally, Quick Wash produces a biosolids product that is low or free of phosphorus—this allows the recovered biosolids from WWTPs to be land applied in many regions of the country, reducing or eliminating much of the cost associated with transporting and landfilling phosphorus-contaminated biosolids.



A sample of the Quick Wash byproduct – Calcium Phosphate – settling out of solution.

Renewable Nutrients' Quick Wash mobile pilot trailer.

"The daily operating reports and the data I received while the Quick Wash pilot was active at our treatment plant indicated just how effective the process can be at removing and recovering phosphorus from our sidestream," said Tim Woody, superintendent of the City of Raleigh's Neuse River Wastewater Treatment Plant.

"I'm glad we were able to play a part in the Quick Wash pilot process by hosting the mobile unit and providing a venue from which Renewable Nutrients could demonstrate this new technology," added Woody. ●

Quick Wash™ is a trademark of Renewable Nutrients, LLC

www.RenewableNutrients.com