

## FOND DU LAC WTRRF, WISCONSIN

### Astraseparator® and AnammoPAQ™ Systems

Combining two proven technologies for sustainable effluent treatment at low total cost of ownership.



#### THE CHALLENGE

- Stringent requirements for nitrogen removal in recycle from digestion/dewatering to inlet of plant
- Minimize foot print
- Low energy and chemicals consumption

#### OVIVO'S SOLUTION

- Astraseparator® system to settle excess influent TSS efficiently
- AnammoPAQ™ process to sustainably convert sidestream Ammonia-N to N<sub>2</sub> via deammonification

#### BENEFITS

- Significant energy and chemicals savings in mainstream biological process
- Freeing up of capacity in main liquid line due to less ammonia in recycle stream
- Substantially compact process with small reactor volume
- Less sludge production per year



The Fond du Lac WTRRF, WI has been operation since 1949. It is rated for a design flow of 11 MGD and has a conventional activated sludge mainstream treatment for Nitrogen and Phosphorus removal.

With upcoming increasingly stringent Nitrogen and Phosphorus limits, the Fond du Lac WTRRF began looking at optimal ways to increase treatment capability at the plant and to future proof the facility. The Fond du Lac WTRRF, WI is a unique facility employing a Temperature Phased Anaerobic Digestion (TPAD) process for Biosolids stabilization and Centrifuges for dewatering. Further the plant is at the forefront of co-digestion and accepts several types of industrial wastes to boost biogas production. This leads to a concentrated sidestream with over 1,200 mg/l of influent Ammonia-N, contributing at times almost 40% of the

Ammonia-N load on main liquid line. Being a progressive and highly innovative facility, newer technologies were given strong consideration and after thorough evaluation, in 2014, side stream treatment via deammonification to remove ammonia in the recycle streams was determined to be the treatment method of choice. This was followed by a rigorous analysis of the different technologies and processes in the market and after exhaustive review of treatment capabilities, references, footprint and determination of ease and robustness of process operation, the Ovivo-Paques AnammoPAQ™ system was selected.

## OVIVO'S SOLUTION

A comprehensive study by Strand & Associates, Inc. resulted in the selection of the Astra separator® combined with AnammoPAQ™ process to achieve the plant's treatment goals.

The process entailed using the Astra separator® system to treat effluent from the sludge dewatering to capture any excess TSS being discharged in the sidestream and optimize downstream treatment operations.

The clear water from Astra separator® is then fed to AnammoPAQ™ process (which is a high rate, continuous flow, granular sludge process) where Ammonia-N is directly converted into nitrogen gas by a combination of Ammonia Oxidizing Bacteria (AOB) and Anammox bacteria, in a single stage via the process of deammonification.

The effluent water from the AnammoPAQ™ process is recycled back to main inlet plant. The objective of the sidestream treatment process to reduce Ammonia-N in the sidestream to < 200 mg/l, without any caustic addition.

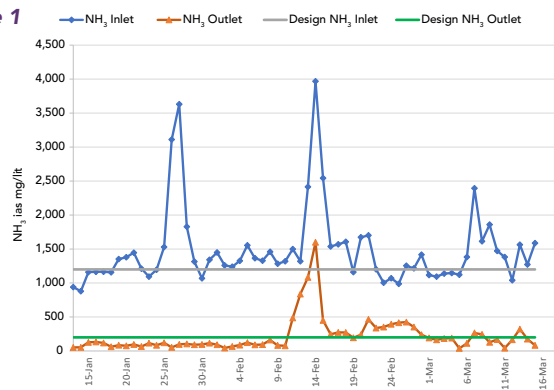
## PROCESS ADVANTAGES

- 60% Savings in Energy due to lower aeration demand
- 100% Savings in External Carbon
- 90% Savings in Footprint
- 90% Savings in Sludge production

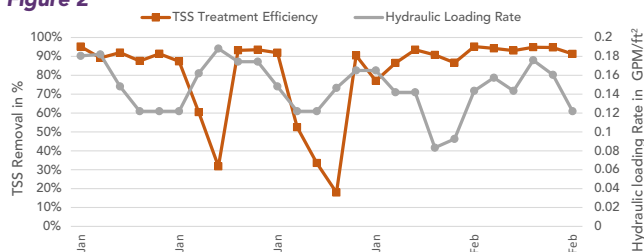
## SYSTEM OPERATION AND PROCESS DATA

Post commissioning, the system was seeded on January 8th using granular anammox catalyst from existing AnammoPAQ™ plants. While the process was expected to startup within an aggressive 3 to 4 weeks timeline, what was remarkable was that the system was able to reach the desired treatment levels i.e. effluent Ammonia-N of < 200 mg/l within 1 week of seeding making it the fastest ever deammonification system startup globally in history (Figure 1, right). As a result the project timeline could be advanced and hence the performance test was undertaken immediately after, based on consultation with the plant, consultant and contractor. Figures 2 and 3 (below) show the system performance for the Astraseparator® system for TSS removal and AnammoPAQ™ system for Ammonia-N removal versus loading rate, respectively. It was seen that the system performed consistently well during the ensuing performance test period achieving the requisite TSS and Ammonia-N levels of < 200 mg/l each for TSS and Ammonia-N, thereby easily passing the test.

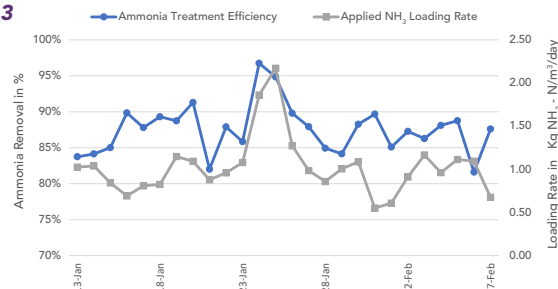
**Figure 1**



**Figure 2**



**Figure 3**



For more information contact your local Water Treatment Expert at the number

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