

ACTIVATED SLUDGE TREATMENT USING BAE™ FOR NITROGEN REMOVAL

OPERATIONAL EFFICIENCY CASE STUDY

FACTS

- Average daily flow of 20 MGD
- Secondary treatment process
- Two Egg-shaped Digesters
- Complete mix system

Belt Filter Press



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TREATMENT OVERVIEW

This WWTP provides service to 15 municipalities with approximately 207,000 residents, covering a total service area of 150 square miles. The plant is currently permitted to treat **27 MGD**. The plant treats leachate from the local landfill as well as septage and food waste.

The treatment plant consists of:

- Bar Screens
- Grit Removal
- Primary Settling Clarifiers
- Activated Sludge
- Final Clarifiers
- Disinfection
- Anaerobic Digesters (Egg Shape)
- Land Application (Sludge)

The wastewater plant treats Waste Activated Sludge and Primary Sludge. These are blended and dewatered on the Belt filter presses. The filtrate then moves to the return stream back to the plant and the sludge is land applied.

PROJECT INTRODUCTION

The plant was experiencing high amounts of Nitrogen in the plant effluent. The state ordered the plant to do expensive testing (Bio Assay) to monitor and remedy the problem. **Prodex®**, the manufacturers of **BAE™** (Biological Activity Enhancer™), was contacted to help assist with the problem. The plant had used BAE™ earlier when their Aeration Basins were affected with high biological loadings from larger than normal amounts of leachate that had been delivered to the plant. The addition of BAE™ was able to quickly resolve all of the issues.

In September of 2019, BAE™ was fed @ .5 mg/L or ½ gallon per million gallons of influent flow.

Contact us for a Free Evaluation: info@prodexproducts.com | (856) 234-4540
Prodex® | Mt. Laurel, NJ | www.ProdexProducts.com

RESULTS SUMMARY

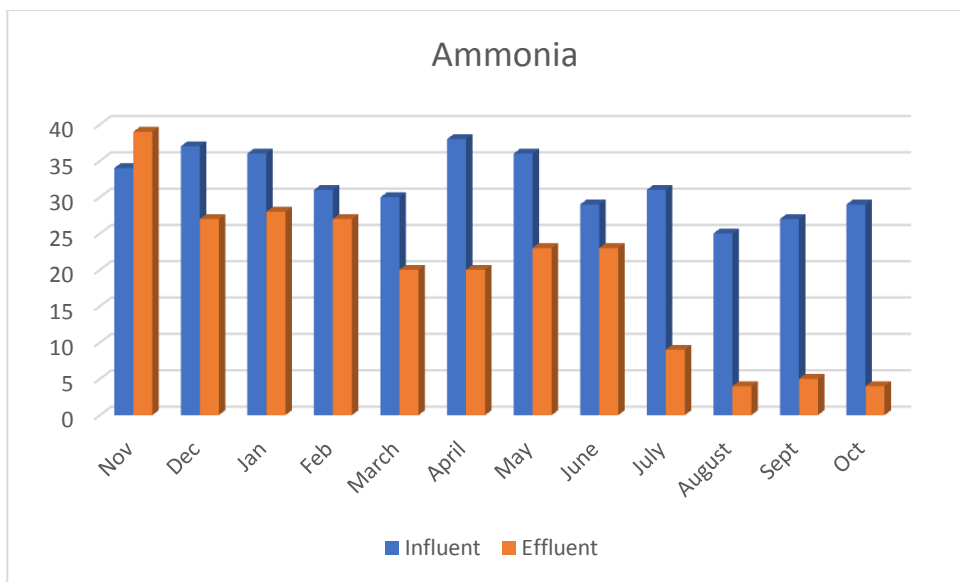
In August of 2019 the utility contacted Prodex® to help resolve an excessive nitrogen issue facing their plant. The company came in and set up a baseline dosage of BAE™ and were able to quickly find success. After that, Prodex® worked on optimizing the dosage to accommodate the fluctuating loadings. **Over the next 3 months Prodex® was able to come up with a standard dosage to bring the effluent numbers from 39 mg/L in Nov. 2019 down to 4 mg/L in Aug. 2020- which was a 90% reduction.**

In the Fall, the Prodex® team recommended that the plant add BAE™ to the facility's grease pit which kept the gas feed line to the digesters open. When BAE™ was tested, the biogas created in the digesters overwhelmed the flare. Because of this, the plant reconfigured the flare to handle the excessive amounts of biogas produced by using BAE™. The plant also had an empty basin that was not in use so the Prodex® team recommended that the delivered leachate be placed into this basin and fed at a low rate over a 24-hour period instead being hit with large amounts of leachate within an 8-hour period. This proved beneficial along with the use of BAE™ to controlling the Nitrogen loadings that the plant had to treat.

Data was collected and reviewed weekly.

Rain events in August 2020 happened including a hurricane and several days of heavy rain caused the plant to experience higher than normal influent flows and leachate deliveries (Hurricane 8/5/2020 & Heavy Rain 8/7/2020). The plant handled the higher flows and loadings keeping the Nitrogen in the plant effluent at a very low amount.

Prodex® personnel suggested that the plant use an existing holding basin as an equalization basin to control the flow of higher loading influent coming in over a 24-hour period. This enabled plant personnel to better treat the leachate coming in versus the shock loadings of the past.



***A 90% reduction in effluent nitrogen amounts after only 1 year.**

NITROGEN AMOUNTS ENTERING & LEAVING PLANT		
Month	Influent	Effluent
Nov. 2019	34	39
Dec. 2019	37	27
Jan. 2020	36	28
Feb 2020	31	27
March 2020	30	20
April 2020	38	20
May 2020	36	23
June 2020	29	23
July 2020	31	9
Aug. 2020	25	4
Sept. 2020	27	5
Oct. 2020	29	4

