



This case study demonstrates the effectiveness of Synagro's wastewater treatment systems in addressing compliance issues related to lagoon effluent discharge. By reducing the annual discharge mass load of key pollutants, these systems offer a sustainable and cost-effective solution for municipalities struggling to meet strict regulations.

The SynaPure™ solution offers the ability to have seasonal treatment onsite without large, upfront capital expenditures and operating staff to operate and maintain the system. The implementation of this technology at lagoon treatment plants can result in improved water quality, environmental protection and regulatory compliance at a low cost, ensuring the plant's long-term viability and responsible environmental stewardship.

THE PREMIER SUSTAINABLE SOLUTIONS PROVIDER IN NORTH AMERICA

Synagro delivers environmentally beneficial products, services and circular innovation by reimagining product design, material use and resource efficiency.

INTRODUCTION

Wastewater treatment plants utilizing lagoons face ongoing challenges in meeting strict effluent discharge regulations especially during the colder months of the year. Lagoon systems often struggle to consistently remove key pollutants to acceptable levels, leading to frequent noncompliance fines and environmental repercussions. To address these issues, these plants can implement Synagro's SynaPure mobile, membrane-based wastewater treatment system for targeted, seasonal pollutant removal.

CHALLENGE

Lagoon systems frequently lack the capacity to handle the increasing wastewater treatment demands from growing populations and industrial influents. The effluent discharged from the lagoons can thus exceed permissible levels of various pollutants, including biological oxygen demand (BOD), chemical oxygen demand (COD), Total Suspended Solids (TSS) and nutrients including ammonia nitrogen (ammonia-N) and phosphorus particularly during the winter months. This can lead to a reduction in the overall system capacity, as the system is prevented from discharging during several months of the year. The persistent violations can further threaten the plant's operation and thus highlight the need for a more robust treatment solution. However, lack of upfront capital and full-time operating staff in remote locations often prevent the implementation of traditional and more hands on treatment systems.

SOLUTION

Plants can therefore opt for the SynaPure™ mobile, membrane-based wastewater treatment system as a flexible and efficient solution. This system, housed in a shipping container for easy deployment and relocation, utilizes ultrafiltration (UF)/nanofiltration (NF) and reverse osmosis (RO) membranes to achieve targeted pollutant removal especially during the winter months:

- **Ultrafiltration/Nanofiltration** – Removes organics as well as the solids and colloids, thereby improving water quality.
- **Reverse Osmosis** – If needed, water can be further treated via reverse osmosis by removing dissolved organic matter thereby further reducing BOD and COD levels and also nutrients such as Ammonia-N and Total Phosphorus (TP). Additionally, the membranes can help remove pathogens such as E. coli, not only meeting, but exceeding discharge requirements.

SUCCESS

The implementation of the SynaPure system can yield significant improvements without a large, upfront capital expenditure:

- **Removal of Key Pollutants** – The system effectively targets and removes over 95% of specific pollutants such as BOD, COD, TSS, Ammonia-N and Phosphorus.
- **Reduced Annual Discharge Mass Load** – Consistent removal of pollutants leads to a significant decrease in the annual mass load discharged to the environment, minimizing environmental impact.
- **Improved Compliance** – Plants can achieve consistent compliance with effluent discharge regulations, eliminating noncompliance fines and mitigating environmental risks.

ADDITIONAL BENEFITS

- **Flexibility** – The mobile system's compact design facilitates rapid and seasonal deployment, maximizing its utility
- **Scalability** – The system's modular nature enables easy expansion to accommodate future growth in wastewater treatment demands.
- **Operational Optimization** – The system's low energy consumption, minimal maintenance requirements and operation by experienced Synagro staff, eliminates the need for full-time operations staff thus leading to significant operational cost savings.

ABOUT THE SYNAPURE WASTEWATER TREATMENT SYSTEM

The SynaPure wastewater treatment system is a flexible, single-pass process capable of treating a wide variety of influent wastewater types to produce direct discharge or reuse quality effluent. Provided on a skid or built into a shipping container, the system can be rapidly deployed to virtually any site.

The technology behind the SynaPure system removes contaminants including inorganic and organic pollutants, total suspended solids, total dissolved solids, PFAS, heavy metals and pathogens that can create challenges and disposal issues for our current and future customers.¹

¹https://www.epa.gov/system/files/documents/2021-09/multi-industry-pfas-study_preliminary-2021-report_508_2021.09.08.pdf

Climate Change

We've baselined our Scope 1, 2 and 3 CHG emissions and calculated our beneficial handprint.



Product Stewardship

In 2023, we processed 16 million tons of biosolids, organics and residuals of which 80% was reused for a beneficial purpose.



Technology and

Circular Innovation

We are collaborating with CharTech Solutions to pilot an industry-first process to treat biosolids.



To learn more about our sustainability efforts and how we plan to grow our business sustainably, visit www.synagro.com/sustainability.



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