



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 a lagoon treatment plant resulted 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

A municipal wastewater treatment plant utilizing lagoons faced ongoing challenges meeting strict effluent discharge regulations especially during the colder months of the year. The lagoon system struggled to consistently remove key pollutants to acceptable levels, leading to frequent noncompliance fines and environmental repercussions. To address these issues, the plant implemented Synagro's SynaPure mobile, membrane-based wastewater treatment system for targeted, seasonal pollutant removal.

CHALLENGE

The lagoon system for a community lacked the capacity to handle the increasing demands of the growing population. The effluent discharged from the lagoons exceeded permissible levels of various pollutants, including biological oxygen demand (BOD) and chemical oxygen demand (COD), Total Suspended Solids (TSS) and nutrients including ammonia nitrogen (ammonia-N) and phosphorus particularly during the winter months. This led to a reduction in the overall system capacity, as the system was prevented from discharging during several months of the year. These persistent violations threatened the plant's operation and highlighted the need for a more robust treatment solution. However, lack of upfront capital and full-time operating staff in the remote community prevented implementation of traditional treatment systems.

SOLUTION

The plant opted for the SynaPure™ mobile, membrane-based wastewater treatment system as a flexible and efficient solution. This system, housed on a trailer for easy deployment and relocation, utilized ultrafiltration (UF) and reverse osmosis (RO) membranes to achieve targeted pollutant removal during the winter months:

- **Ultrafiltration** – Removed some of the organics as well as the suspended solids and colloids, improving water clarity.
- **Reverse Osmosis** – Further refined the water by removing dissolved organic matter thereby reducing BOD and COD levels and also nutrients such as Ammonia-N and Total Phosphorus (TP). Additionally, the membranes helped remove pathogens such as E. coli. not only meeting, but exceeding discharge requirements.

SUCCESS

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

- **Removal of Key Pollutants** – The system effectively targeted and removed specific pollutants including:
 - BOD: > 95%
 - COD: > 90%
 - TSS: > 99%
 - Ammonia Nitrogen: > 90%
 - Phosphorus: > 90%
- **Reduced Annual Discharge Mass Load** – Consistent removal of pollutants led to a significant decrease in the annual mass load discharged to the environment, minimizing environmental impact.
- **Improved Compliance** – The plant achieved consistent compliance with effluent discharge regulations, eliminating noncompliance fines and mitigating environmental risks.

ADDITIONAL BENEFITS

- **Flexibility** – The mobile system's compact design facilitated rapid and seasonal deployment, maximizing its utility.
- **Scalability** – The system's modular nature enabled 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, eliminated the need for full-time operations staff and led 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 2022, we processed 6.5 million tons of biosolids, 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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