NUVODA
MOB Process®

CASE STUDY:
INTENSIFYING SBR CYCLES
LEESBURG, FLORIDA

THE CHALLENGE:

Community and population growth in Florida frequently causes capacity challenges for the state's WWTP's. Due to rapid growth in Leesburg, Florida, the city was looking for a cost-effective process intensification solution to handle the expected flow increases and tightening effluent requirements. Recently expanded to 6 MGD, the plant has no room for additional treatment basins in its next expansion. This constraint led the city to explore solutions that do not require new tankage.

The city elected to evaluate the MOB Process® through a full-scale demonstration of one of their Sequencing Batch Reactors (SBRs). Their goals during the demonstration were to determine whether the MOB Process® could intensify their treatment plant to prepare for the future increase in demand by improving settleability and reducing cycle times. The existing plant operates six (6) SBRs, using jets for both aeration and mixing.

FACILITY OVERVIEW:

Facility Flows	▪ 3 MGD (11.4 MLD) Average Flow ▪ 6 MGD (22.7 MLD) Design Flow
Effluent Goals	▪ BOD5 < 20 mg/L ▪ TSS < 5 mg/L ▪ NH3 < 1 mg/L ▪ Potential future BNR requirements
Project Goals	▪ Improve settleability ▪ Reduce settling time ▪ Increase nirtification rate ▪ Reduce reaction time

WHAT WAS ACHIEVED:

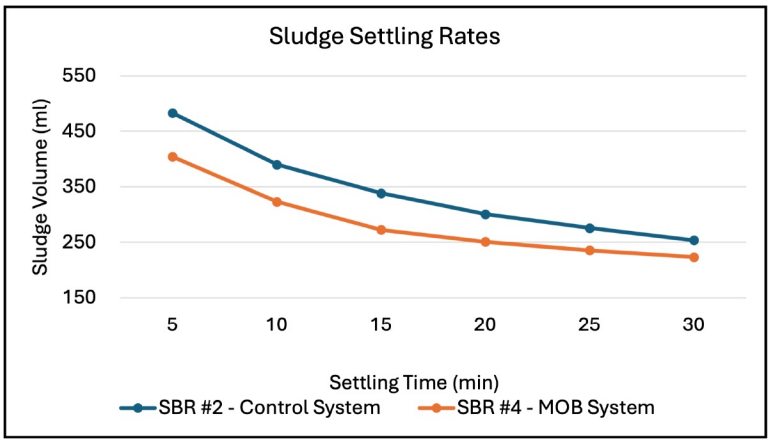
- **Improved Settleability** - average SVI_{30} reduced from 135 mL/g (control) to 86 mL/g (MOB), reaching the same settled volume in about half the time
- **Enhanced Nitrification** - the MOB basin achieved complete nitrification within the reaction cycle where the control did not; lab rate testing confirmed higher biological activity
- **Increased Phosphorus Removal** - total phosphorus removal was consistently higher in the MOB basin than the control
- **Process Intensification** - treated more ammonia load in less reaction time
- **Proven Durability** - operated a stable media concentration with no modifications to the existing equipment

WHY THE MOB PROCESS WAS CHOSEN:

Conventional SBRs must serve dual functions as both activated sludge bioreactors and secondary clarifiers, operating on a time-based cycle to balance variation in both incoming hydraulic flow and organic load. When greater capacity of either flow or load is required, more SBRs must be built. Nuvoda's MOB Process® offers an alternative. The MOB Process® intensifies the bioreactors by 1) increasing the nitrification rate, allowing for a decreased reaction time, and 2) improving the settling rate, reducing the required settling time. Together, these two factors allow the existing process to operate more cycles per day, eliminating the need for new tankage and relieving bottlenecks within the process.

During the demonstration, the MOB Process® was installed in one of Leesburg Turnpike WWTP's SBR basins, while the other basins operated conventionally as controls. Over the seven-month trial, the BioKarrier™ media established a robust biofilm and proved durable within the facility's treatment system. The MOB SBR was carefully controlled to reduce the SRT, promoting the establishment of a nitrifying biofilm that aided in both settling and ammonia removal. The intensified nitrification, coupled with the improved settling rate, proved an effective way to get more from the existing infrastructure.

Once stabilized, the MOB SBR consistently outperformed the control across nitrification rate, sludge settleability, and phosphorus removal. During treatment cycles, the MOB basin treated higher ammonia loads than the control basin, while simultaneously operating with a shorter reaction time. The results from the demonstration support the MOB Process® as a retrofit that requires no new tankage and can be installed directly into the existing SBR cycle.



WHAT THE MOB PROCESS CAN DO FOR YOU:

- Increased Clarifier Capacity
- Stabilized Settling Performance
- High Loading Process Stability
- Full-Scale Demonstrations and Retrofits

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