NUVODA
MOB Process

CASE STUDY:
BIOLOGICAL NUTRIENT REMOVAL
RENO, NEVADA

THE CHALLENGE:

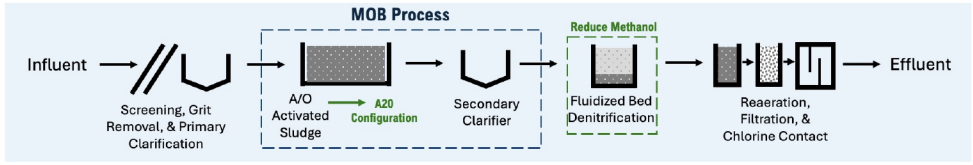
Truckee Meadows Regional Water Reclamation Facility (TMWRF) in Reno, Nevada, operates with an Anaerobic/Oxic (A/O) activated sludge configuration, which presents a known trade off between biological nitrogen and phosphorus removal. In the case of TMWRF, they have always optimized for biological phosphorus removal. In the past, when the facility attempted to achieve full nitrification in the bioreactors, elevated nitrate concentrations in the return activated sludge (RAS) compromised the anaerobic zone and disrupted biological phosphorus removal. As a result, nitrogen removal at the facility has long relied on resource- intensive tertiary treatment processes. To reduce reliance on these systems and improve overall process efficiency, TMWRF aimed to shift more of the nitrogen removal to the secondary processes rather than through tertiary treatment. The challenge lay in achieving stable, year-round nitrification within the existing bioreactors while maintaining the deeply anaerobic conditions necessary to support consistent biological phosphorus removal.

Facility Details	▪ 6.12 MGD (23.2 MLD) Average Flow in MOB Train ▪ A/O Configuration
Secondary Effluent Goals	▪ Ammonia: <1.0 mg/L ▪ NOx <6 mg/L ▪ Ortho-P <0.5 mg/L
Project Goals	▪ Cold weather nitrification at short SRT ▪ SVI consistently <120 mL/g ▪ Partial TN removal with MOB Process, reducing FBR methanol demand

WHY THE MOB PROCESS WAS CHOSEN:

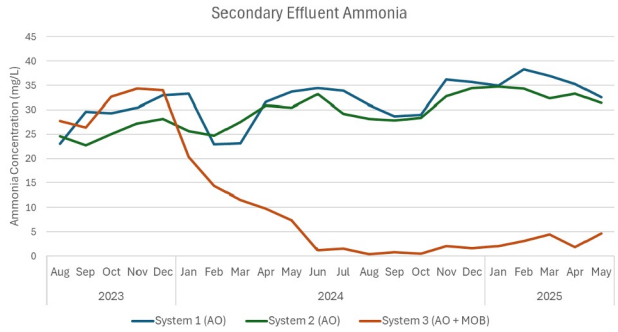
The MOB Process was selected for its ability to achieve full nitrification at a short solids retention time (SRT), reducing dependence on energy and chemical-intensive tertiary treatment. At TMWRF, the MOB Process demonstrated that it can maintain stable nitrification with a short SRT and cold weather conditions. This allows for lower suspended biomass inventory, which minimizes clarifier loading and reduces the risk of biological washout during periods of higher flow. Additionally, the improved SVIs demonstrated with the MOB Process contributed to even more stable clarifier operation at TMWRF.

Beyond its nitrification benefits, the MOB Process also demonstrated significant denitrification in the same volume. A portion of the aerobic volume was converted to an anoxic zone with the installation of two temporary mixers. As a carbon source, a fraction of influent wastewater was directed into this new zone. This pseudo-A2O configuration enabled denitrification within the bioreactors, decreasing nitrate load to the downstream fluidized bed reactors and significantly reducing methanol consumption. Ultimately, the fine-tuned operation demonstrated that it could achieve 94% biological P-removal efficiency, and 76% total N-removal efficiency in the existing bioreactor footprint.



WHAT WAS ACHIEVED:

- Stable effluent ammonia values <1 mg/L, at a 3 - 4-day SRT
- Improved TN removal with the addition of a denitrification zone in the existing basin
- Achieved effluent total phosphorus <0.5 mg/L biologically
- SVI improved in MOB train compared to other trains



WHAT THE MOB PROCESS CAN DO FOR YOU:

- Improved Nitrification and Nutrient Removal
- Resilience to Upsets, Load Variation, and Low Temperatures - Down to 8°C
- Stabilized Settling Performance
- Retrofits into any Process Configuration

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