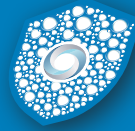


Break the Upset Cycle:

MOLEAER NANOSHIELD™ DELIVERS FIRST STABLE SEASON IN YEARS



Client: Henry N. Wochholz Regional Water Recycling Facility, Yucaipa, CA (WRWRF)

Treatment Plant Metrics:

- Influent flow: 4 MGD (15,000 m³/d)
- BNR Process
- NanoShield Installed: Nov. 2024

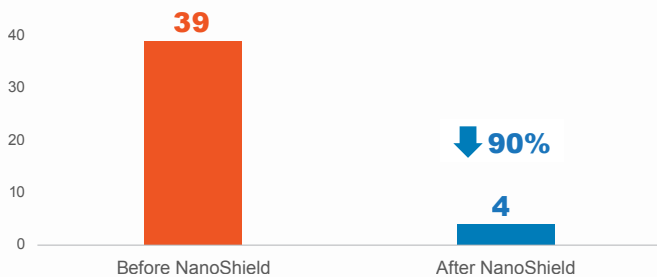
Key Challenges:

- Recurring seasonal process upsets
- Biomass die-off and loss of nitrification

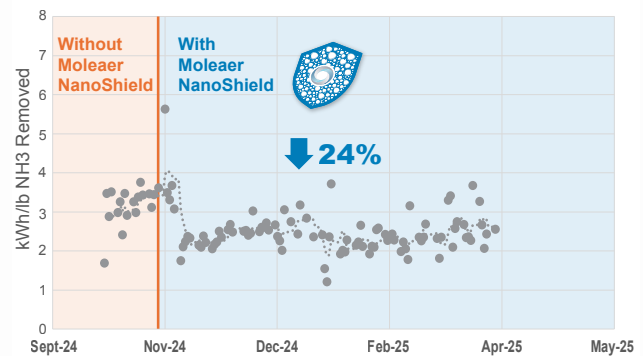
Performance Results:

- 24% ↓ blower energy/lb ammonia removed
- 90% fewer ammonia upsets & 90% faster recovery time

Ammonia Upset Days During Cold Weather (Nov-Apr)



Blower Power Draw per Pound Ammonia Removed



Challenge:

Chronic Process Instability

The WRWRF experienced seasonal upsets that disrupted biological nutrient removal, compromised effluent quality, required emergency interventions and caused regulatory compliance risks. Operators relied on reactive approaches, but these costly interventions diverted resources from optimization activities and did not prevent the cycle of recurring upsets.

Solution:

NanoShield Nanobubble Pretreatment Solution

To break the cycle, in November 2024, plant deployed Moleaer's NanoShield upstream in the treatment process, allowing nanobubble benefits to cascade through the entire treatment train for system-wide process intensification rather than localized improvement.

Results:

System-Wide Optimization and Operational Stability

- ✓ Performed like water was 10°C warmer, restoring ~70% of lost nitrification capacity
 - 90% fewer ammonia upsets and 90% faster recovery
 - 67% lower effluent ammonia (from 0.18 to 0.06 mg/L)
 - 24% energy savings per pound of ammonia removed (3.3 → 2.5 kWh/lb-N)
- ✓ ~20% increased treatment capacity
- ✓ Consistent Title 22 reuse compliance

Future Implications

The results at WRWRF demonstrate that utilities don't need to build their way to better performance. NanoShield unlocked more capacity from existing infrastructure, a replicable model as treatment standards continue to tighten.



Discover how nanobubble pretreatment solves common wastewater challenges:
www.moleaer.com/en-us/industries/wastewater

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