

CASE STUDY: Fort Collins, Colorado Wastewater Treatment Facility



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Application:	Aerobic Digestion
Design Flow (ADF):	3.0 MGD ADF and 4.6 MGD MMF
Mixing Efficiency:	≈ 0.2 HP/1000 FT ³
Compressors:	Two (2) 50 HP Rotary Screw
Blowers:	Three (3) 150 HP Positive Displacement
Design Engineer:	Burns & McDonnell

BioCycle-D Selected to Meet Colorado's Stringent Effluent Discharge Limits

Organized in 1965, the Boxelder Sanitation District provides sanitary sewer services to customers near Fort Collins, CO. The district, which maintains 100 miles of sewer lines, constructed a state-of-the-art wastewater treatment facility (WWTF) in 2013 to keep pace with the rapid growth of the area.

In 2020, Boxelder expanded and upgraded the WWTF to meet future population growth and accommodate new stringent effluent discharge limits on nitrogen and phosphorus. The upgraded facility was designed to treat a maximum monthly flow of 4.6 MGD and produce less than 0.7 mg/l total phosphorus (P) and 7 mg/l total inorganic nitrogen (N), ensuring clean water is returned to nearby Cache la Poudre River.

Using a construction management at risk (CMAR) delivery method, the district selected Moltz Construction, Inc. to consult on the development and construction of the project. Moltz evaluated conventional aerated mixing aerobic digestion technology alongside EnviroMix's BioCycle-D Optimized Aerobic Digestion Process.

BioCycle-D was ultimately selected as it offered the lowest total cost of ownership, saving the plant more than \$175,000 annually.



BioCycle-D's alternating aerobic and anoxic cycles maximize VS destruction and improve sludge dewatering.



ENERGY EFFICIENCY

75% power savings
versus traditional
diffused aeration
design approach



STRAIGHTFORWARD OPERATION

Automatically adjusts
cycle operating based
on loading conditions

Minimal, localized
maintenance



PROCESS OPTIMIZATION

Precise process
control improves
volatile solids
destruction and
sludge dewaterability



UNPARALLELED FLEXIBILITY

Bottom-up, uniform
mixing supplements
aeration

Suitable for a wide
variety of applications



From the operator interface terminal (OIT), operations staff can monitor all equipment and control the aerobic digestion process.



Decoupled fine bubble diffused aeration delivers oxygen and the BioMix Compressed Gas Mixing System provides efficient mixing.

“I’m very pleased with the energy use. The power needed for the digesters is much less than we were anticipating.”

Craig Hibbard, Boxelder WWTF Plant Manager

EnviroMix worked with Boxelder’s engineer Burns & McDonnell, designing the optimized aerobic digestion process to meet the sludge treatment needs of the expanded system. BioCycle-D replaced a sludge storage lagoon that recycled high amounts of nutrients to the secondary process, reducing the efficiency of the plant and necessitating expensive sludge removal every couple of years. **Prior to installing BioCycle-D, Boxelder had to spend \$400,000 to dredge out their waste stabilization pond every year.**

In a conventional aerated mixing aerobic digestion process, aeration is used to both provide the oxygen needed for digestion and completely mix the tank contents. There is little to no automated process control or instrumentation feedback. This approach results in very high levels of energy consumption and high concentrations of P and N recycled to the secondary process.

BioCycle-D is designed by right-sizing the diffused aeration system to satisfy process oxygen demand and applying energy efficient mixing through a BioMix™ Compressed Gas Mixing System. The process decouples aeration from mixing, facilitating independent control over oxygen delivery and mixing, thus preventing over-aeration and wasted energy. BioCycle-D solves the problems of the conventional approach by utilizing dissolved oxygen (DO) and oxidation reduction potential (ORP) instrumentation, allowing for real-time control to address changing process conditions.

The system also saves plants on maintenance costs. Craig Hibbard, Boxelder’s Plant Manager, commented, “We don’t have any subsurface mixers we have to haul out of there that could get fouled... 90% of the repairs are all doable above ground.”

BioCycle-D saved the Boxelder Sanitation District 75% energy consumption versus conventional diffused air mixing while enabling the plant to reduce the ammonia and nitrate levels to low single digits in both the digester decant stream and the screw press return stream, preventing nitrogen spikes to the secondary process.



Contact sales@enviro-mix.com today to discuss the ways EnviroMix can optimize your aerobic digester solutions.