

CASE STUDY: Polson, Montana Water Resource Recovery Facility

Application:	Aerobic Sludge Digestion
Design Flow (ADF):	0.47 MGD
Mixing Efficiency:	≈ 0.15 HP/1000 FT ³
Compressor:	One (1) 20 HP Rotary Screw
Blowers:	Three (3) 40 HP Tri-Lobe
Design Engineer:	DOWL



BioMix Compressed Gas Mixing nozzle headers integrated with coarse bubble aeration system

BioCycle-D™ Aerobic Digestion Process Selected for Water Resource Recovery Facility Upgrade

In 2018, the City of Polson contracted with DOWL to design a new water resource recovery facility, replacing the city's lagoon-based treatment system that had been constructed in the 1950s.

The new facility was designed to serve a population of approximately 5,500 with future expansion potential to serve more than 9,000. The new design included treatment processes that result in total nitrogen effluent limits of 8 mg/l and total phosphorus of 0.8 mg/l.

DOWL evaluated numerous treatment solutions and selected a sequencing batch reactor process to provide nitrogen and phosphorus removal. **EnviroMix's BioCycle-D™ Aerobic Digestion Process was selected as an integral part of the design to treat the sequencing batch reactors (SBR) waste sludge.**

Selection criteria for EnviroMix's system included both energy efficiency — which was **approximately 50% of the energy of a conventional aerated digester alternative** — and improved sludge digestion process control so as to minimize phosphorus return in the digester supernatant.



ENERGY EFFICIENCY

50% power savings
versus traditional
diffused air or jet
aeration mixing
systems



STRAIGHTFORWARD OPERATION

Automatically adjusts
cycle operation based
on loading conditions

Minimal, localized
maintenance



PROCESS OPTIMIZATION

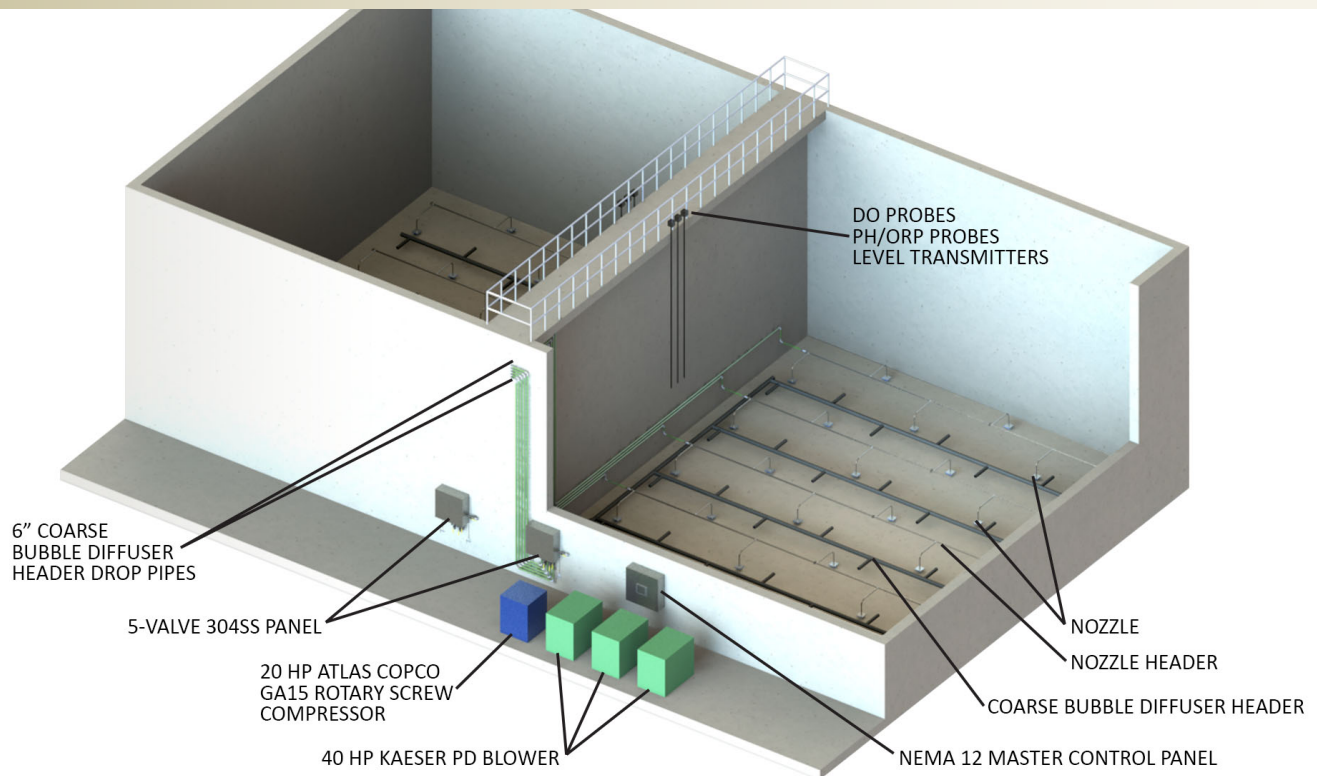
Precise process
control improves
volatile solids
destruction and
sludge dewaterability



UNPARALLELED FLEXIBILITY

Bottom-up, uniform
mixing supplements
aeration

Suitable for a wide
variety of applications



BioCycle-D Aerobic Digestion Process operates at less than 50% of the energy of a conventional aerated digester alternative.

A conventional aerobic sludge digestion process that uses diffused aeration for mixing often results in over aeration, which can cause uncontrolled nitrification, depletion of alkalinity, and increased energy consumption. Conversely, BioCycle-D is an energy efficient aerobic sludge digestion process which decouples aeration from mixing and incorporates process feedback through instrumentation to control and maintain the optimum digestion environment.

So how does it work?

- During the BioCycle-D **aerobic cycle**, aeration blowers operate to maintain a user-selected DO concentration.
- The BioMix Compressed Gas Mixing System operates automatically as required during any portion of the operating cycle to provide adequate tank mixing.
- During the **anoxic cycle**, aeration blowers are disabled, and all mixing functionality is provided by the BioMix system.
- During the **decant cycle**, all aeration and mixing activity stops, sludge settles, and supernatant is returned to the head of the plant for improved secondary treatment performance.

BioCycle-D is designed to be expandable and provide low-cost operation, and it plays an important part in keeping Polson's user fees low.



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