CASE STUDY:

Russellville, Arkansas Pollution Control Works (PCW)

EnviroMix

www.enviro-mix.com

Application:	BNR Mixing (Anaerobic and Anoxic Selectors)
Design Flow (ADF):	8.5 MGD
Mixing Efficiency:	≈ 0.1 HP/1000 FT^3
Compressors:	Two (2) 30 hp Quincy QGD
Design Engineer:	Phase 1: CDM Smith Phase 2: Hawkins Weir

BioMix nozzle headers installed on the tank floor of an anoxic selector in Phase I.

BioMix Delivers O&M Savings and Process Benefits in Multi-phased Upgrade

City Corporation, a nonprofit that manages the water and wastewater systems for the city of Russellville, operates the Russellville PCW facility which provides wastewater treatment for 30,000 residents, local industry, and the city of Dover. Constructed in 1964, the PCW utilizes an activated sludge process. **Recent upgrades were conducted in two phases, both of which included EnviroMix's BioMix Compressed Gas Mixing System.**

PHASE I: Completed in 2014, the goal of Phase I was to **upgrade the facility to achieve compliance with nitrate effluent limits** via conversion to a Modified Ludzack Ettinger (MLE) process, including the addition of anoxic selectors upstream of the aerobic zone and a nitrate-rich internal mixed liquor return from the aerobic zone to the anoxic selectors.

BioMix was chosen to mix eight anoxic selectors created within the existing footprint of two operating process trains as well as four anoxic selectors in a new process train. Minimizing maintenance and **providing an estimated 75% power reduction**, BioMix utilizes one compressor system versus the alternative of 18 mechanical mixers. Additionally, BioMix does not impart measurable oxygen, creating optimal anoxic conditions.

ENERGY EFFICIENCY

Phase I:
75% energy savings
vs. mechanical mixers

Phase II:
60% energy savings
vs. mechanical mixers

STRAIGHTFORWARD OPERATION

All in-tank components are maintenance free, non-clogging, and self-cleaning

PROCESS OPTIMIZATION

Provides **complete mixing with negligible oxygen transfer**

Optimizes conditions for nitrogen and phosphorus removal

UNPARALLELED FLEXIBILITY

Leverages **common compressors and controls for multiple applications**

Operator-adjustable mixing parameters

> "I like all the controls that we have. We can adjust the frequency or the amount of time in between [bursts] for each basin where the bubbles go off."
>
> — Tony Sanchez, Lead Operator

PHASE II: Completed in 2022, **the goal of Phase II was to upgrade the facility to achieve biological phosphorus removal** via conversion of the MLE process to an Anaerobic-Anoxic-Oxic (A2O) process. This upgrade included the addition of anaerobic selectors upstream of the anoxic selectors which receive primary effluent and return activated sludge (RAS) to facilitate the selection of phosphorus accumulating organisms (PAOs), with subsequent release of phosphorus under anaerobic conditions and the excess accumulation in the aerobic zone.

BioMix was chosen to mix the anaerobic selectors due to the ease of installation and because the technology does not impart measurable oxygen, creating optimal anaerobic conditions. Integrated with the controls for Phase I, Phase II simply required the addition of nozzle headers, a local valve module, and a master control panel. Further reducing capital costs, the 40-psi low-pressure rotary screw compressors (duty/standby) were sized during Phase I with adequate capacity to serve the future Phase II, eliminating the need for additional compressors.

In Phase II, BioMix saved the Russellville PCW **more than 60% in energy consumption versus traditional mechanical mixers**. EnviroMix is proud to partner with repeat customers like City Corporation, providing communities like Russellville with long-term operation and maintenance savings and optimal process control.

Duty and standby rotary screw compressors serve the BioMix system.

The Russellville PCW facility

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