

CASE STUDY: Broomfield, Colorado Wastewater Reclamation Facility



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Application:	Thickened WAS & Primary Sludge Holding
Design Flow (ADF):	12 MGD
Mixing Efficiency:	≈ 0.4 HP/1000 FT ³
Compressors:	Two (2) 20 HP Atlas Copco GA15+
Nozzles:	70
Design Engineer:	Tetra Tech, Inc.

BioMix[®] System Reduces Energy and Maintenance Demands in Thickened Sludge Holding Tanks

The Broomfield Wastewater Reclamation Facility thickens waste activated sludge (WAS) and primary sludge to 6% prior to anaerobic digestion. Before being sent to centrifuges for dewatering and recycling of the biosolids through land application, the thickened anaerobically digested sludge is transferred to two (2) concrete sludge holding tanks.

Both round tanks are 50' in diameter and 7' deep. They were originally constructed in the 1950s as primary clarifiers, converted to sludge holding tanks in the 1980s, and retrofit with diffused air mixing in the late 2000s.

Focused on the goals of reducing energy consumption, improving mixing, and reducing maintenance, the plant upgraded the mixing equipment in the thickened sludge holding tanks in 2020.

The plant staff and their consulting engineering firm Tetra Tech Inc. selected EnviroMix's BioMix Compressed Gas Mixing System for the project, enabling them to meet all three goals. **With zero in-tank maintenance, the BioMix system provides homogenous, energy efficient mixing while saving the plant approximately \$10,000 annually.**



Concentric rings of nozzle headers uniformly mix the basin contents from the bottom up.



ENERGY EFFICIENCY

Requires less than half the energy of the previous coarse bubble aeration system



STRAIGHTFORWARD OPERATION

Non-clogging, maintenance-free components in the tank



PROCESS OPTIMIZATION

Uniformly mixes thickened 6% anaerobically digested WAS and primary sludge



UNPARALLELED FLEXIBILITY

Ideal for conical tank bottom configurations
Circular headers eliminate "dead spots"



The valve control module enables the optimal mixing regime by controlling air release duration, frequency, and sequence.



Low maintenance compressor system matches mixing air demand with duty and standby configuration.

BioMix provides low operating costs, reduced maintenance, and improved mixing versus the previously installed coarse bubble aeration system.

The BioMix system enabled the Broomfield WRF to reach their goals of reducing energy consumption, improving mixing, and reducing maintenance.

The coarse bubble aeration system relied on positive displacement aerators. The new BioMix system consists of two (2) 20 HP rotary screw compressors (one duty and one standby), an automated valve control panel, and concentric rings of nozzle headers. The total estimated power required for BioMix to achieve homogenous mixing of 6% sludge in this application is approximately 15 BHP, **representing energy savings of more than 50%.**

The amount of hair, rags, and other stringy material that winds up in the sludge fouled the previous aerated mixing system, resulting in high maintenance requirements and poor mixing effectiveness. The tanks are also covered, resulting in confined space safety requirements to perform maintenance. The BioMix system has only non-clogging, self-cleaning components in tank. With **no mechanical or electrical components in the sludge**, maintenance demands are minimized.

Additionally, the Broomfield tanks have sloped floors and a cone bottom. The previous aeration system was unable to suspend solids at the bottom of the tank due to the significant dead space beneath the aeration system. Featuring engineered-to-order headers and nozzles, the BioMix system integrates with any tank geometry or configuration. The **circular headers easily conform to the slope of the floor**, eliminating “dead spots.”



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