

# Bio<sup>M</sup>x™ Success Story — 60%+ Energy Reduction

## F. Wayne Hill WRC, 60 MGD, Gwinnett County GA

### Summary

- Bio<sup>M</sup>x system demonstrates *60% power savings* versus leading submersible mechanical mixer
- Maximum efficiency through multiple basin application

A full-scale, 11-month demonstration project performed from April 2009 - February 2010 at the 60 MGD F. Wayne Hill Water Resources Center (WRC) in Gwinnett County, Georgia, demonstrated that Bio<sup>M</sup>x provides comparable mixing to a submersible mechanical mixer, but uses significantly less power and significantly less maintenance. The innovative Bio<sup>M</sup>x system provides mixing in liquids by firing short bursts of compressed air through engineered nozzles affixed to the floor of the tank. Standard firing parameters of 0.5 second duration at 4.0 to 5.0 second intervals provide proven, effective mixing. Virtually all power consumption is limited to the compressed air source (which may be used across multiple process tanks).



F. Wayne Hill WRC Biological Treatment Basins

The F. Wayne Hill WRC has ten parallel trains of biological treatment tanks. Within each train are anaerobic, anoxic, and oxic cells with recycles for biological nutrient removal.



Bio<sup>M</sup>x tank installation at F. Wayne Hill WRC

For the demonstration, Bio<sup>M</sup>x was installed in multiple cells in Train 10. Within Cell A1 (41'6" x 55' x 24' deep), Bio<sup>M</sup>x was compared directly against the previously-installed 15 HP submersible mechanical mixer with controls. The Bio<sup>M</sup>x system consisted of an Ingersoll Rand 15 HP variable speed rotary screw compressor, thirty floor-mounted nozzles, piping, and controls.



Bio<sup>M</sup>x Nozzle

## Bio<sup>M</sup>x™ Success Story — 60%+ Energy Reduction (cont.)

Within Cell A1, mixing results were comparable; however, the Bio<sup>M</sup>x system used *46% less power*. (See Table 1.)

**TABLE 1**  
Submersible Mixer      Bio<sup>M</sup>x

Amps	22.05	7.26
Volts	472.2	479.3
Power Factor	0.56	0.91
Horsepower	13.54	7.32
HP/1000 ft <sup>3</sup>	0.247	0.133
Kilowatts	10.10	5.46

Power readings were also observed when mixing three Train 10 process cells. Each tank had similar Bio<sup>M</sup>x configurations but utilized the same 15 HP compressor. As a result, the system showed *even greater power reduction (60%+)* when compared to three submersible mixers. (See Table 2.)

**TABLE 2**  
Submersible Mixer (x3)      Bio<sup>M</sup>x

Amps	66.15	15.14
Volts	472.2	483.0
Power Factor	0.56	0.93
Horsepower	40.62	15.79
HP/1000 ft <sup>3</sup>	0.247	0.097
Kilowatts	30.30	11.78
\$/Yr @ \$0.06/kW-Hr	\$15,926	\$6,192
\$/Yr @ \$0.09/kW-Hr	\$23,889	\$9,287
\$/Yr @ \$0.12/kW-Hr	\$31,851	\$12,383

### Demonstrated Results

The Bio<sup>M</sup>x system provides significant power savings when compared to single unit submersible mechanical mixer installations. However, when installed in multiple process basins, the compressed air source may be utilized across several basins and up to its capacity. This maximizes the compressor power efficiency, and in turn minimizes Bio<sup>M</sup>x power cost. The Bio<sup>M</sup>x system installed in three cells at F. Wayne Hill WRC demonstrated a *60%+ power reduction* when compared to three submersible mechanical mixers in similar application.

Mechanical mixers, which are typically sized by unit volume (HP/1000 ft<sup>3</sup>), require multiple units for multiple basins, and consume respective multiples of power per equally-sized unit. However, Bio<sup>M</sup>x system power utilization may be efficiently applied across multiple tank systems, which share a single, optimally-sized compressor. The single operating compressor is also more easily maintained and accessible than multiple submerged mechanical mixers.

### Contact EnviroMix

Please contact EnviroMix to size your particular application. We look forward to working with you to minimize power, while effectively mixing, reducing maintenance, and addressing nutrient removal.

### Contact Your Local Representative