

Post-Treatment Aeration Demonstrations

BlueInGreen, LLC demonstrated the Supersaturated Dissolved Oxygen Injector (SDOX[®]) technology in two post-treatment aeration applications. The SDOX[®] was installed and operated at two regional wastewater treatment facilities: the City of Fayetteville Paul R. Noland Wastewater Treatment Facility and the Rogers Pollution Control Facility. In both demonstrations, the SDOX[®] was directly compared to existing post-treatment aeration systems.

◀ City of Fayetteville Wastewater Treatment Facility Demonstration ▶



The portable SDOX[®] system pictured was demonstrated for CH2M HILL OMI at the City of Fayetteville Wastewater Treatment Facility. The SDOX[®] oxygenated the post-treatment effluent continuously over six days.

The demonstration indicated implementing an SDOX[®] would result in an **80% cost savings** per year. This demonstration convinced OMI and the City of Fayetteville to purchase the SDOX[®].

Table 1: Side-by-side Comparison of the SDOX[®] with the Existing Fayetteville Post-Treatment Aeration System.

| | DO Increase | Oxygen Consumed | Power Consumed | Cost Efficiency* |
|-------------------------|-------------|--------------------------|----------------|------------------|
| | (mg/L) | (lb O ₂ /day) | (HP) | (\$/lb DO) |
| Existing System | 3.9 | 4040 | 30 | \$0.81 |
| SDOX[®] | 3.2 | 505 | 13.6 | \$0.15 |

*Based on 2007 electricity and oxygen costs.

Existing Post-Treatment Aeration System Setup and Performance:

- Two surface agitators/aerators provide most post-treatment aeration. A supplemental oxygen feed system provides additional oxygenation.
- The existing post-treatment aeration system increases the effluent dissolved oxygen (DO) concentration by an average of 3.9 mg/L.
- The surface agitators/aerators draw 30 HP, and the supplemental oxygen feed system uses 4040 lb O₂ per day.

SDOX[®] Demonstration Performance:

- SDOX[®] was the only source of aeration for raising the DO of the effluent during the 6 days of continuous operation.
- The SDOX[®] increased the DO of the effluent above the NPDES permitted concentration of 10 mg/L.
- The average DO concentration increase resulting from SDOX[®] was 3.2 mg/L.
- The SDOX[®] used an average of 505 lb O₂ per day.
- Of the oxygen used, 95% was measured as added DO. This means the SDOX[®] delivered nearly all of the oxygen purchased as DO.
- The SDOX[®] drew an average of 13.6 HP during the test.
- The SDOX[®] had an average efficiency of 1.5 lb O₂ per HP-hr.

◀ Rogers Pollution Control Facility Demonstration ▶



The portable SDOX[®] system shown oxygenated the post-treatment effluent of the Rogers Pollution Control Facility over the course of three days.

Results of the demonstration indicate significant cost savings using the SDOX[®]. The SDOX[®] increased the effluent DO nearly 50% above the existing aeration system. The SDOX[®] oxygen delivery efficiency was nearly equal to the existing system while using **79% less power** than the existing system.

Table 2: Side-by-side Comparison of the SDOX[®] with the Existing Rogers Post-Treatment Aeration System.

| | DO Increase | Oxygen Consumed | Power Consumed | Aeration Efficiency |
|-------------------------|-------------|---------------------------|----------------|---------------------|
| | (mg/L) | (lb O ₂ / day) | (HP) | (lb DO / HP-hr) |
| Existing System | 4.5 | 182 | 32 | 0.25 |
| SDOX[®] | 6.7 | 268 | 6.7 | 1.5 |

Existing Post-Treatment Aeration System Setup and Performance:

- Two blower/diffuser units and a supplemental oxygen feed system provide post-treatment aeration.
- The existing post-treatment aeration system increases the effluent DO by an average of 4.5 mg/L.
- The blower/diffuser units draw 10 HP each, and the supplemental oxygen feed system draws 12 HP and uses 182 lb O₂ per day.

SDOX[®] Demonstration Performance:

- SDOX[®] was the only source of aeration for raising the DO of the effluent during the 3 days of continuous operation.
- The SDOX[®] increased the DO of the effluent above the NPDES permitted concentration of 10 mg/L.
- The average DO concentration increase resulting from SDOX[®] was 6.7 mg/L.
- The SDOX[®] used an average of 268 lb O₂ per day.
- Of the oxygen used, 89% was measured as added DO.
- The SDOX[®] drew an average of 6.7 HP during the test.
- The SDOX[®] had an average efficiency of 1.5 lb O₂ per HP-hr.

“During BlueInGreen’s SDOX[®] demonstration at the Rogers Pollution Control Facility during the winter of 2007, the SDOX[®] matched the aeration capacity of the existing blower and sidestream oxygenation system in the treated effluent discharge while using on average only 21% of the power consumed by the existing system. The SDOX[®]’s efficient design appeared simple to operate and easy to incorporate in an existing treatment plant. Based on its demonstration, I believe the SDOX[®] has the potential to significantly cut O&M costs. Working with the staff of BlueInGreen[®], I was assured their product was engineered well, and I was impressed at their willingness to address all concerns in the future.”

- Michael Lawrence, Plant Manager, Rogers Water Utilities

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