

Case Study: Great Bend

NITROGEN & PHOSPHORUS REMOVAL

Great Bend, Kansas
(POPULATION 15,400)

Monthly Electrical Savings
Capital Savings



By investing \$50,000 in instrumentation and control systems and operating the city's oxidation ditch wastewater treatment facility differently than designed, Great Bend is now removing phosphorus so efficiently that a \$6.0 million facility upgrade is no longer under consideration.

In-line dissolved oxygen monitoring equipment was installed and integrated with the new variable frequency drive installed on Great Bend's aeration equipment. Using this new equipment, plant staff adjusted aeration settings over a period of weeks until a sweet spot was found. Now, the aeration equipment provides enough oxygen to support ammonia-nitrogen conversion to nitrate-nitrogen while limiting the supply sufficiently to create an oxygen deficient zone in the main body of the oxidation ditch to support nitrate-nitrogen conversion to nitrogen gas.

As reported in **TPO Magazine** (<https://www.tpomag.com/editorial/2021/06/an-innovative-operations-group-proves-nutrient-reduction-doesnt-have-to-cost-a-fortune>), the plant's anoxic zone has been converted to a fermenter for biological phosphorus removal by closing the gate between the main body of the ditch and by operating the anoxic mixer so infrequently as to create beneficially septic conditions in the tank.

Effluent total-nitrogen now averages 5 mg/L; prior to the changes it was at 10 mg/L.
Effluent total-phosphorus now averages 0.5 mg/L; prior to the change it averaged 2.5 mg/L.

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