

Pictures of Hays, KS WWTP After Upgrade with OxyProcess Technology & the OxyLift™ OxyStrip™ Diffuser



Design:

- 7500 SCFM air total
- 26 racks of 24 diffusers each
- 624 diffusers total
- 1,609 sq ft of active diffuser membrane
- OxyStrip™ Diffuser: 1.5 meter silicone material
- 2.58 sq ft membrane active area per diffuser



- Each diffuser rack is retrievable above grade individual without de-watering basin
- Only hand tools allowed to raise diffuser rack
- Thern hoist is transportable along bridge
- Each rack can be retrieved & transported to the diffuser maintenance area
- Aerial view of basin with mixers & diffusers preparing for next 50 years of service



Performance, Redundancy, and Diffuser Innovation

OxyProcess SND

The City of Hays, Kansas is a vibrant, progressive community located in the center of Kansas. While the community continues to grow, water is rationed due to limited sources. The old wastewater treatment plant could not achieve Total Nitrogen (TN) and Total Phosphorus (TP) limits, so an upgrade was necessary to achieve NPDES permit limits. JAEGER AERATION LLC solved the NPDES permit issues with a new single basin design which simultaneously provides Nitrification and De-nitrification. The EngeryPro process design achieves the low TN and TP limits designated in the NPDES permit.



NPDES permit limits & actual influent/effluent quality are as follows:

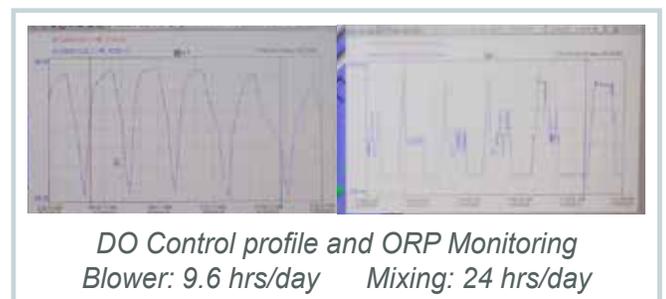
NPDES	Influent	Effluent	NPDES Limit
Flow	2.5 mgd		
BOD avg	182 ppm	< 2.5 ppm	< 5 ppm
TKN avg.	71.2 ppm	0.86 ppm	
Ammonia	65+ ppm	0.0 ppm	< 0.7 ppm
NO ₃ + NO ₂	n/a	1.3 ppm	10 ppm
TP	7.1 ppm	< 1.9 w/o chem	
		< 0.1 w/ chem	1.5 ppm
Power savings vs. previous plant	21 % savings per year		
Infinite Recycle of MLSS	No Anoxic No Anaerobic Selector		

Water conservation for non-potable uses include golf courses, baseball fields and other community property. A single basin design, with no anoxic or anaerobic selector basins are needed for efficiency and reduces the capital investment. The continuous recycle of MLSS and the fine bubble aeration, allows for the anaerobic / anoxic conditions. This can only be achieved with the OxyProcess. This is achieved by the continuous recycle flows of MLSS and RAS as well as mixing the raw influent into the aeration basin. Only 4 small 8 HP KSB Mixers were required, which were CFD Designed for the WWTP, and no separate MLSS pumps are needed.

The OxyProcess SND control of the aeration basins allows for a dissolved oxygen range of 1.5 during the aerobic cycle and 0.0 during the anoxic / anaerobic cycle. During the aerobic cycle the DO is programmed at a set point and the PID Control loop allows the blowers which are VFD controlled to maintain this setpoint during the aeration cycle. During the anaerobic and anoxic cycle, the blowers turn off while the mixers continue to provide mixing. Currently, at full design, the WWTP aerates for a total of 9.6 hours per day. The remaining 13.4 hours per day relies solely on mixing. The 4 KSB mixers mix the 4 million gallons of wastewater with only 32 HP of energy during the non-aerated times per day. This saves over 21% of the energy costs compared to the smaller, previous WWTP.

Construction & Capital Improvement Cost Comparison

The OxyProcess system, with increased redundancy thanks to 26 retrievable diffuser racks, 4 high output / low horsepower mixers, and 2-stage air header system, provided a \$5 million cost savings--with an additional \$150,000 energy cost savings per year--compared to the mechanical aeration system option. The single basin design, without separate selector basins, reduced the excavation costs and concrete volumes by nearly 35%. The new facility hosts a new aerobic digestion basin,



a part of the solids handling process, and a new UV system, replacing the old chlorine system. Even with the new aerobic digestion and UV system, the new facility uses 21% less energy than the previous plant. In a 3-hour cycle, the blowers operate only 1.2 hours and the DO control sensors optimize the blower's output. With the blowers turned off, the OxyProcess cycles through the anoxic and anaerobic cycles to meet TN and TP removal limits.

JAEGER AERATION provided a creative, single SND-BNR solution for the treatment system. The single BNR-SND basin provides all process cycles of oxic, anoxic, and anaerobic to provide excellent effluent. VFD Controlled PD Blowers provide air to entirely retrievable OxyLift™ OxyStrip™ diffusers.

Learn more about the product:

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