

Evaluation of Aeration System Alternatives



Joint Regional Wastewater Treatment Plant

West Haverstraw, New York

Background

The Haverstraw Joint Regional Sewerage Board (JRSB) operates an 8 mgd activated sludge wastewater treatment plant serving the Village of West Haverstraw, Town of Haverstraw, and the Village of Haverstraw. The facility was built in 1972, upgraded in 1979, and was equipped with mechanical aerators that were reaching the end of their useful service life. In addition, plant operators identified the aeration tanks as the source of odor migration problems resulting in odor complaints from the facility's neighbors. The JRSB turned to NYSERDA and Stearns & Wheeler, LLC (a NYSERDA FlexTech contractor) to evaluate aeration system alternatives that save energy, reduce odors, and maintain or improve the plant's level of treatment.

Recommendations

Three possible modifications were identified for the aeration system through NYSERDA's FlexTech Program. Replacement of the existing aerators was also evaluated to provide a baseline against which the other alternatives could be compared.

- Alternative No. 1** - Replacement of existing mechanical aerators in kind.
- Alternative No. 2** - Replacement of existing mechanical aerators with new mechanical aerators, tank covers, and odor control system.
- Alternative No. 3a** - Replacement of existing mechanical aerators with a fine bubble aeration system.
- Alternative No. 3b** - Replacement of existing mechanical aerators with a fine bubble aeration system with automatic controls for nitrification/denitrification.

The study recommended the implementation of a new fine bubble aeration system. Since the soils at the site are poor and any new structure would require piles, a new blower building was recommended to be built on top of an existing aeration tank. Multi-stage centrifugal blowers were recommended as well as flexible membrane diffusers, which eliminated the need for an expensive cleaning system.

Off-Gas testing was conducted to determine the actual oxygen transfer efficiency so that blower sizing could be based on actual data versus assumed variables. The recommended system included PLC-based controls programmed for system cycling to allow nitrification and denitrification.

Incentives and Results

NYSERDA provided **\$20,500** toward the \$41,000 FlexTech project. JRSB has moved forward and installed Alternative No. 3b reducing its energy costs while increasing water quality.

- Incremental installation costs - \$70,000
- Average annual savings - \$42,000/year
- Simple payback period - 1.7 years

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