

Industry News

Mazzei AirJection® System Solves Wastewater Handling Capacity & Cold Weather Operation Problems for a Midwest Corn Milling Plant

The Problem: Although the existing WWTP aeration system was capable of meeting effluent BOD requirements for disposal to a municipal sewer during warm weather, the cooling effect of the surface aerators (due to heat losses from evaporation) adversely impacted performance during winter operation. In addition, the existing aeration system did not have enough capacity to handle the increased load from the planned expansion of the facility.

The Solution: Unlike surface aerators, the Mazzei AirJection® System does not induce cooling of wastewater aeration basins. Even during cold weather operation, the natural heat of compression resulting from forcing the air aspirated by the High Efficiency Mazzei Injector to the bottom of the basin negates any cooling effects of injection of cold air. In addition, the energy introduced by the pumping and circulating of the wastewater through the injectors and nozzles actually introduces heat into the basin. Heat balance calculations indicate that the AirJection® System installed at this facility adds enough energy to increase the temperature of the basin contents by about 0.5 °C/day.

The AirJection® System was sized to meet the aeration requirements for the planned expansion of the milling plant, which is to be completed in 2005 with the addition of more milling capacity.

The System: In order to meet the aeration, mixing and air distribution requirements of the 267' x 170' x 22' SWD basin, a system utilizing four Model 12050 12" Mazzei® Injectors was installed. Each injector operates ten Mazzei® N60 6" Mass Transfer Multiplier Nozzles on four manifolds submerged in the basin. The 12050 injectors flow about 2500 GPM each when operated at the design inlet pressure of 15 PSIG. Each injector naturally aspirates about 200 SCFM of air without the need for blowers or compressors. The N60 nozzles are designed to provide an exit velocity of about 16-18 ft/s resulting in thorough dispersion and mixing of the aspirated air with the bulk of the basin contents. Two dry sump centrifugal pumps are used to supply water to the four Model 12050 venturi injectors.

The Result: The aeration system has been in operation for two months with excellent results, in spite of the fact that the partition curtain, which separates the clarifier zone from the aerated zone, has not yet been repaired. In addition, solids that have accumulated in the bottom of the basin are being stirred up and are adding to the loading of the system. In spite of these problems, effluent BOD levels lower than those produced by the surface aerators are being achieved. In addition, the overall appearance and operation of the basin has improved significantly. Operators report a significant reduction in solids loading since the switch to the AirJection® System.

Most significantly, the operating water temperature has improved significantly in comparison to the surface aerator operation. Historically the basin water temperature during September and October has averaged 60-70 °F with the floating aerators in operation. With the AirJection® System in operation the water temperature is averaging about 95 °F. Because of this, plans to cover the aeration basin in order to maintain adequate water temperature during winter operation are being reconsidered.

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Basin Mixing and Air Distribution
(Note: surface aerators are not in use)