

# Fixed-Film System Enables Cold-Weather Nitrification of Ammonia

The Township of Silver Lake, PA is located in the north-central part of the state, just south of the New York state line. For several reasons, the township has considered a variety of options in dealing with tighter ammonia discharge limits in the community's wastewater effluent. The township's wastewater is processed through separate two lagoons systems: one located at Quaker Lake, PA and the other located at Laurel Lake, PA.

By the summer of 2001 the township was ready to try a new alternative. Working with their consulting engineers (Milnes Engineering of Tunkhannok, PA), the township board elected to install FBC's Bio<sup>2</sup>Bloc system in the two lagoons. At the Laurel Lake WWTP, the flow rate is 64,000 GPD and at the Quaker Lake WWTP, the flow is 26,000 GPD. Influent loads are typical with an average of 35 mg/L ammonia and 200 mg/L BOD. Effluent ammonia for these systems, however, ranges from 9.9 to 31.9 mg/L while NPEDS permit limits the plants to 2.5 mg/L in the summer and 7.5 mg/L in the winter months for Laurel Lake and 10 mg/L for Quaker Lake.



Six unit system installed at Laurel Lake WWTP.



Two unit system installed at Quaker Lake WWTP.

Within three weeks of an early September installation, the systems were in complete nitrification. That is to say, ammonia levels were measured at **UNDETECTED!** The fast action of the system was attributed to the use of pre-seasoned media beds in the Bio<sup>2</sup>Blocs and a good, high level of dissolved oxygen in the basins. As the water temperature dropped from 28 °C to 8 °C, ammonia remained below 2 mg/L. As the water dropped to 3 °C, the system at Quaker Lake kept ammonia levels within permit limits despite the lagoons being covered in 6 inches of ice! The system at Laurel Lake removed ammonia at a good pace (15 mg/L ammonia in the effluent compared to 31 mg/L the previous winter) and was physically expanded to handle the remaining 8.5 mg/L of ammonia – even at the coldest temperatures.

**Within three weeks of installation, the systems were in complete nitrification.**