LemTec™ Process

LEMNA TECHNOLOGIES, INC.

Municipal and Industrial Treatment

Innovative Wastewater Solutions

The Leader In Lagoon Process Technology

The LemTec™ Biological Treatment Process (LBTP) treats wastewater as it flows through a series of aerated lagoons that are divided by baffles to reduce short-circuiting. In colder climates, each cell is covered by a LemTec™ Modular Cover, which enhances system kinetics, retains heat, controls odors, and prevents algae growth. In warmer climates, it may be necessary to cover only the final settling cell in order to promote digestion of sludge and prevent algae growth. Additional technologies, including the Lemna Polishing Reactor and the Lemna Phosphorus Removal System, may also be used for enhanced nutrient removal.

Customer satisfaction is our highest priority . . .

"The installation went very well, and the performance of the system has been excellent. We have been within our discharge limits since the installation, and have been more than satisfied with the performance of this system. I would most certainly recommend the Lemna system to other municipalities which use oxidation ponds and find themselves having problems with discharge limits." ***Operator - R.D., Louisiana***

"Lemna is definitely a leader rather than a follower. In addition, the LemTec™ Biological Treatment Process has over the last two years proven to be an excellent choice. The installation process is simple yet effective in its high degree performance and low maintenance cost." ***Client - B.L., New Hampshire***

"It has been a pleasure to work with Lemna Technologies. The service and support is fast and friendly." ***Client - P.V., Wisconsin***

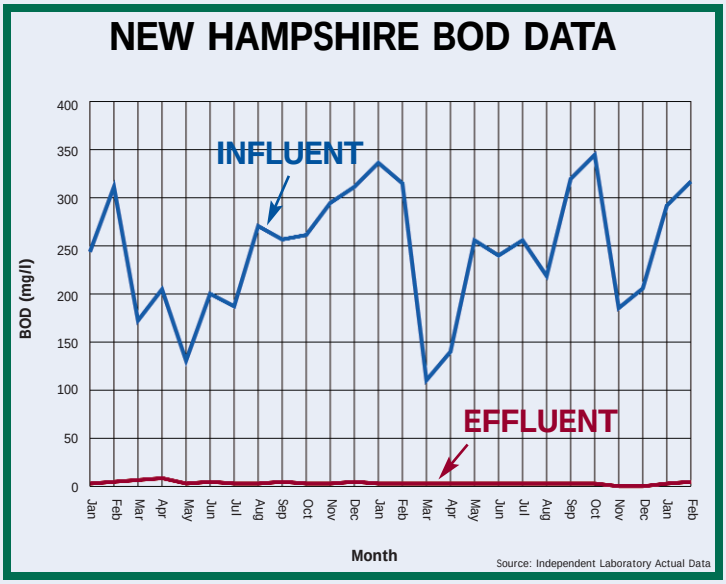
LemTec™ Process Family

LemTec™ Biological Treatment Process is an effective, reliable and affordable solution for existing aerated municipal and industrial wastewater lagoon facilities. The system incorporates the LemTec™ Modular Cover to create a reduced footprint and an operation that is virtually odor-free. The LemTec™ system is the highest performing pond-based aerated lagoon process in the world. Utilizing a series of aerobic treatment cells followed by an anaerobic settling zone and polishing reactor, the LemTec™ Process is capable of achieving year-round effluent limits as low as 10 mg/l BOD, 15 mg/l TSS and 2 mg/l NH_3-N for typical municipal or pre-treated industrial wastewater. Other nutrients such as Phosphorus can also be addressed within the process.

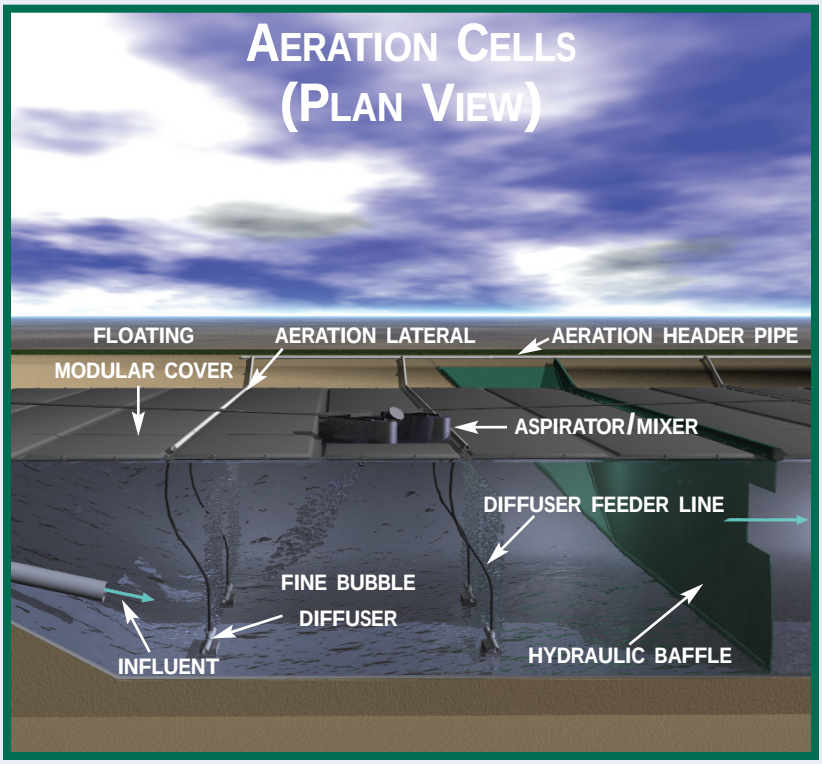
Existing Lagoons or New Construction

LemTec™ Facultative Treatment Process is an effective, reliable and affordable solution for existing facultative municipal and industrial wastewater lagoon facilities. At a fraction of the cost of other traditional systems, the LemTec™ Facultative Treatment Process is unmatched in its ability to meet stringent effluent limits that other traditional pond-based systems can't reach. Utilizing a series of facultative treatment cells followed by a covered settling zone and Lemna Polishing Reactor, the LemTec™ Process is capable of achieving year-round effluent limits as low as 10 mg/l BOD, 15 mg/l TSS and 2 mg/l NH_3-N.

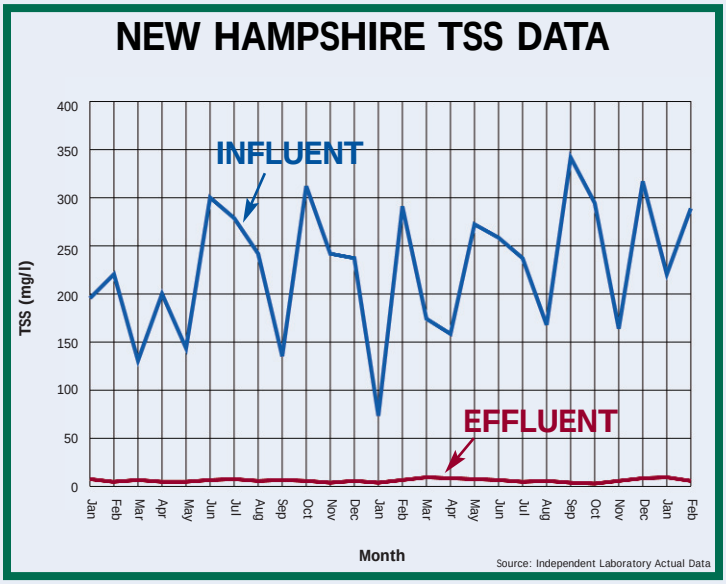
BOD Removal



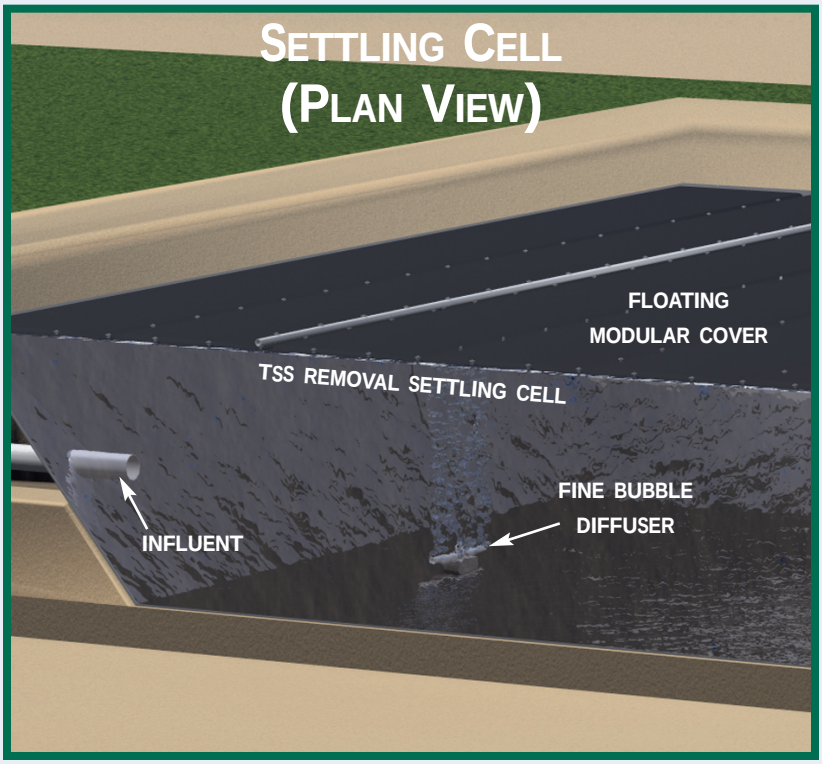
Achieving BOD levels below 10 mg/l reliably and consistently throughout the year. BOD removal to below 30 mg/l is accomplished in the complete mix and partial mix cells of the treatment process with final polishing to below 10 mg/l in the Lemna Polishing Reactor, if required. Lemna's design minimizes temperature fluctuations and the adverse treatment effects of peak flow events on BOD removal. Our low horsepower design is efficient in both aeration and mixing and requires a smaller footprint that is typically 12 days or less in detention time.



TSS Removal



Lemna's settling cell - a clarifier without the moving parts. The settling pond, covered with the LemTec™ Modular Cover, creates an effective zone for clarification of biosolids. The cover prevents algae growth by eliminating sunlight and improves clarification in two ways: 1) it prevents wind action on the water surface, thereby establishing a quiescent zone for solids to settle; and 2) the insulation minimizes seasonal and diurnal temperature fluctuation thereby reducing stirring by thermal currents. In addition, the anaerobic environment in the settling pond digests the biosolids significantly over time with no sludge disposal required for at least 5 to 7 years.

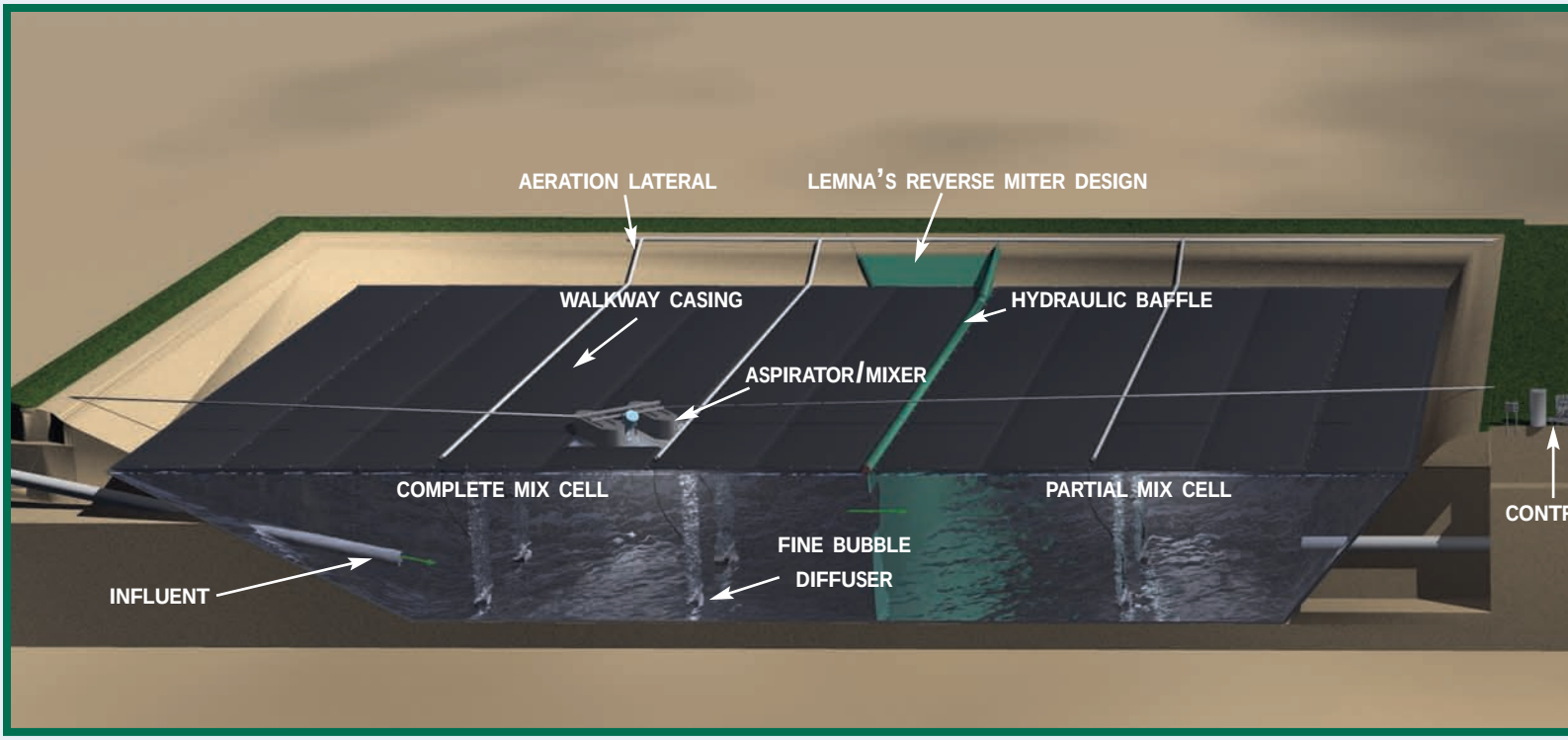


The LemTec™ Biologic

"We have done numerous projects over the last five years using Lemna Technologies Inc., and I highly recommend this company. They are very proficient, have excellent take-offs, detailed instructions, the product is easy to install and their supervisors are knowledgeable and skilled. We look forward to the next opportunity to work with them." ***Contractor - T.S., Louisiana***

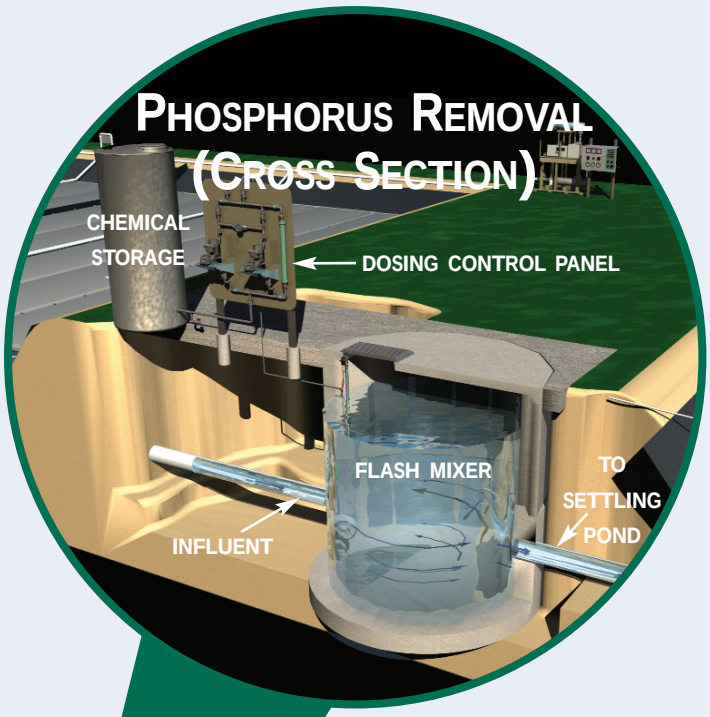
"Since installation, we have noticed excellent odor control, algae control, and our effluent test levels are remarkable. To encourage the choice of Lemna Technologies products, we welcome anyone interested to tour our facilities and/or review our weekly test results." ***Client - J.R., Iowa***

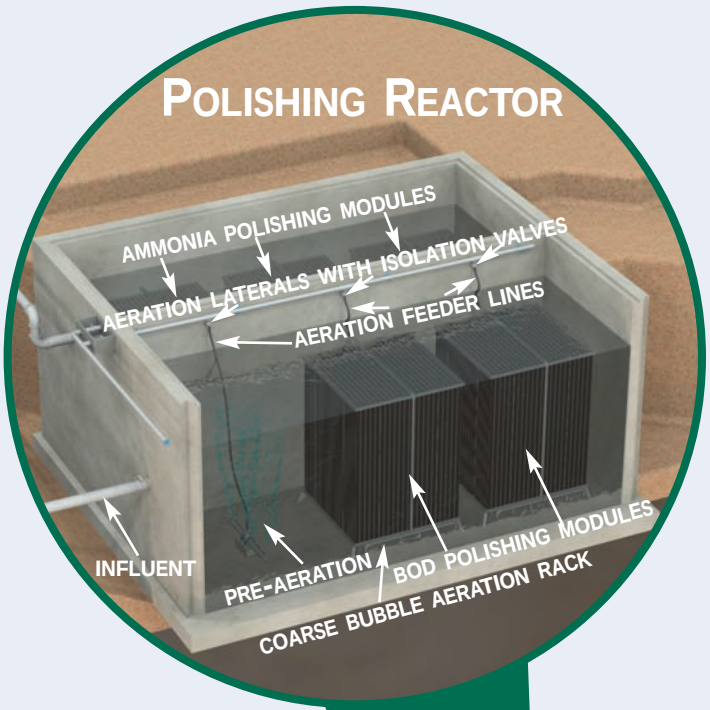
Lemna's cover and staff have provided performance as promised. Anytime we've had questions related to technical support, Lemna has been prompt in their response. I can safely state that maintenance on our cover has been virtually non-existent, and I highly recommend Lemna for anyone considering them for a cover or liner." ***Client - R.L., Minnesota***

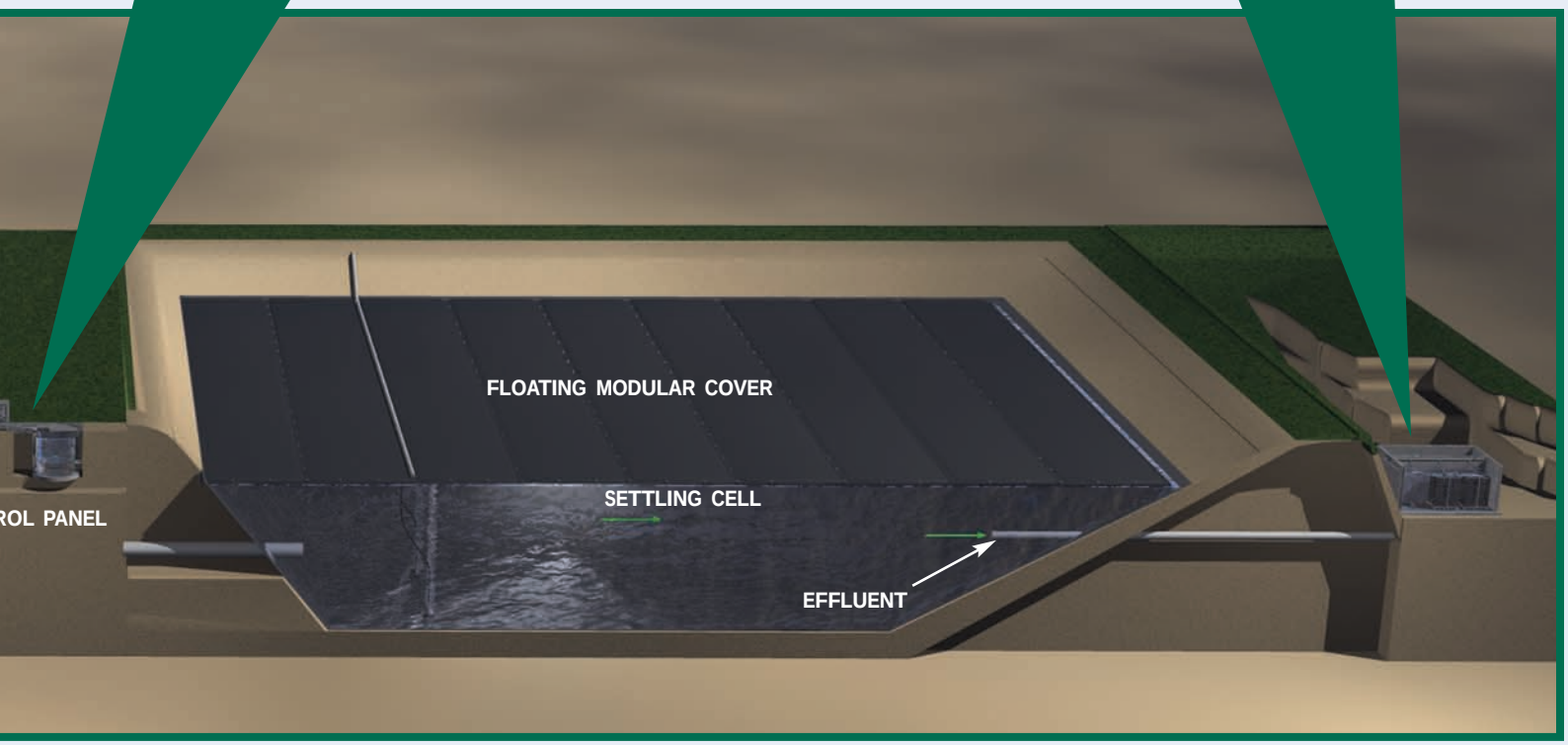


Custom-designed to me

CAL TREATMENT PROCESS

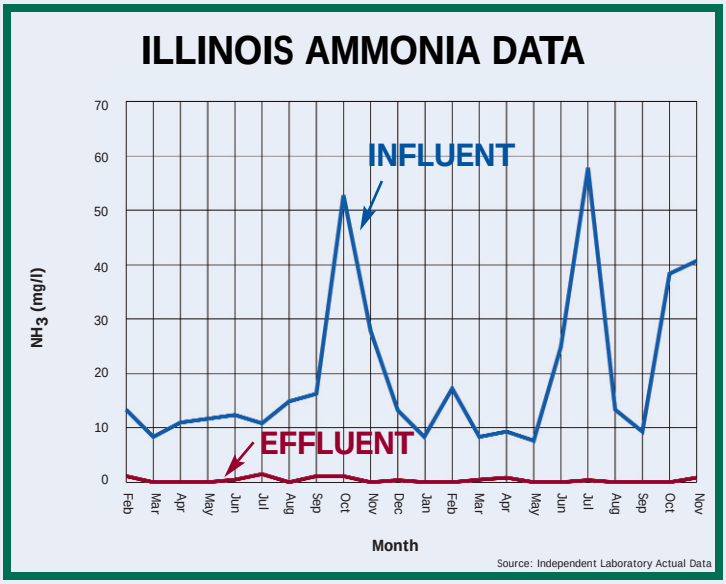




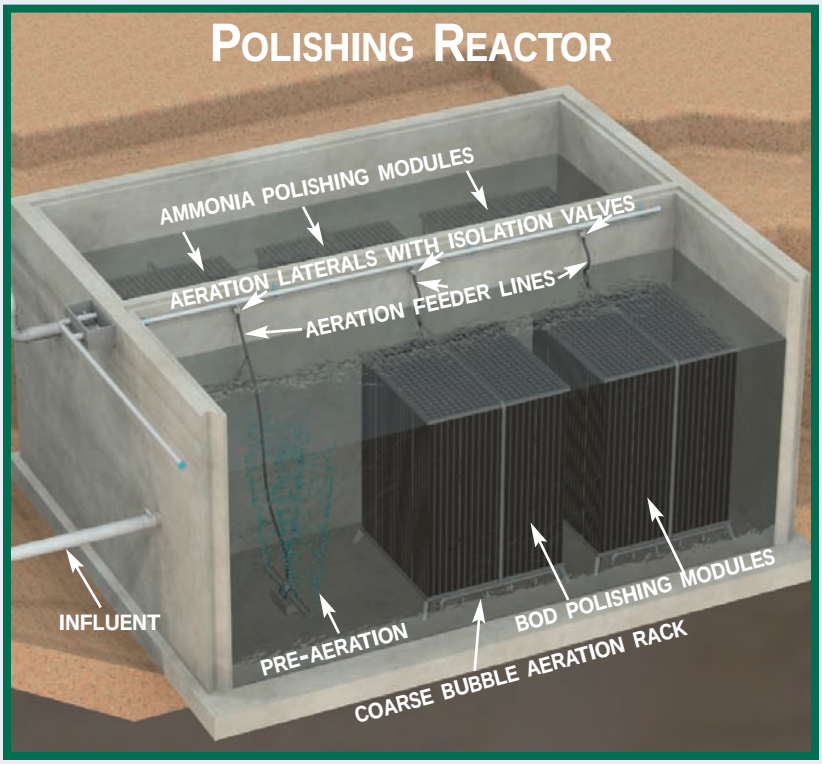


ET YOUR SPECIFIC NEEDS!

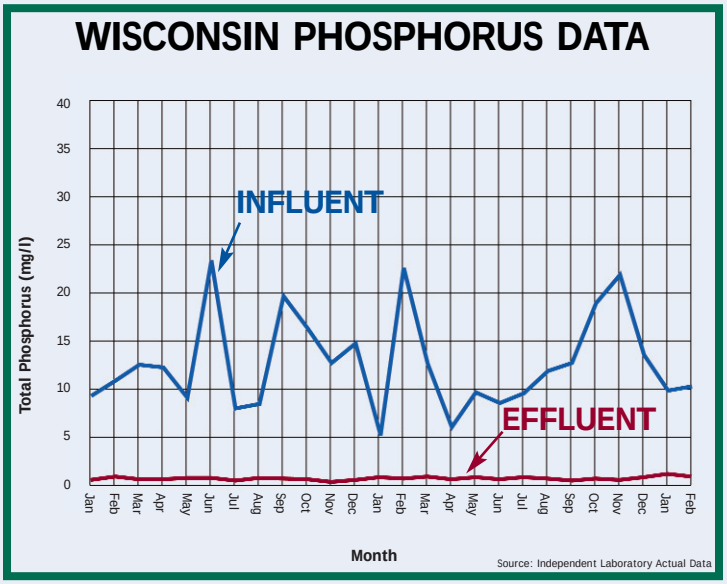
Ammonia Removal



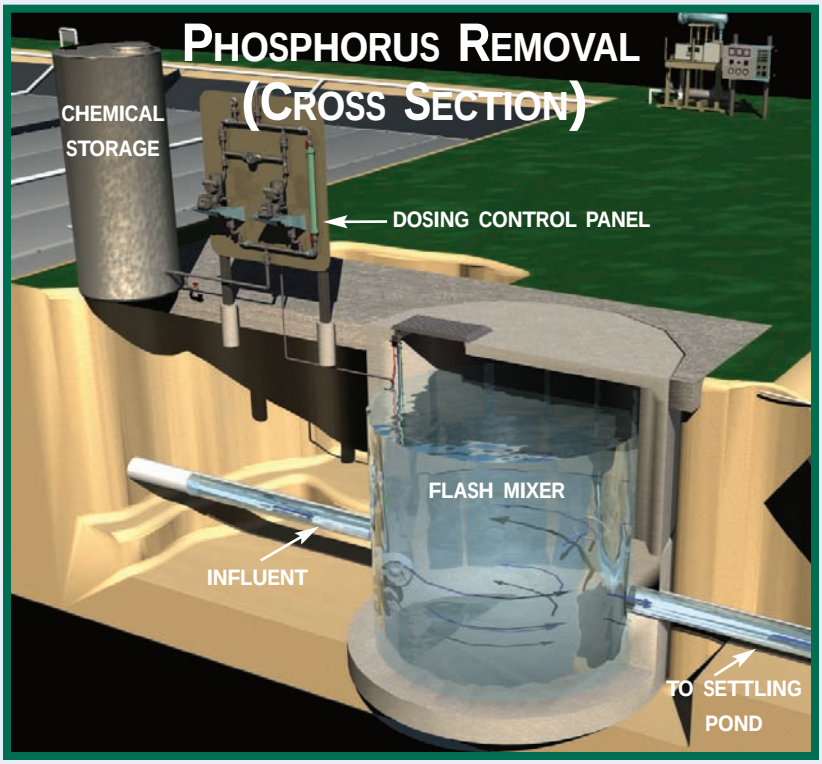
The Lemna Polishing Reactor (LPR) reduces Ammonia Nitrogen (NH_3-N) and BOD. The majority of both BOD and Ammonia removal in the Lemna design occurs in the complete mix cell. However, the LPR is included in the LBTP design to meet low BOD_5 (<10 mg/l) and NH_3 (<1 mg/l) limits if required. The LPR utilizes fixed media to promote an environment for submerged attached-growth bacteria. The LPR is composed of stainless steel hardware and frames that compress UV resistant PVC media, making the reactor sturdy and one of the best filters in the industry.



Phosphorus Removal



We use a chemical dosing system, low horsepower pumps and mixers that make operation easy. Phosphorus is precipitated chemically by the addition of coagulants, including alum or ferric chloride. Precipitation causes contaminants that are either dissolved or suspended to settle out of solution as solid floc particles that are removed along with waste biological sludge. Our system is low cost and reliable.

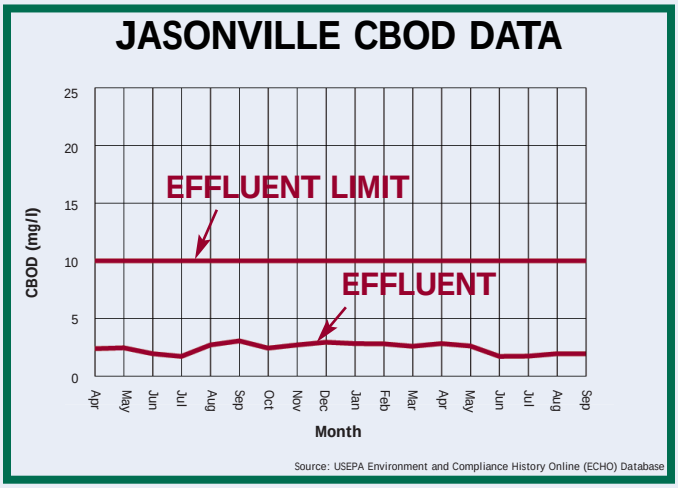


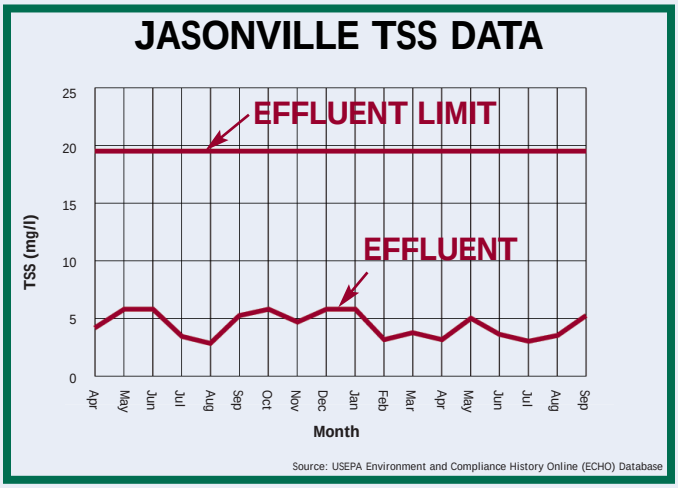
Case History

Aerated lagoon upgrades

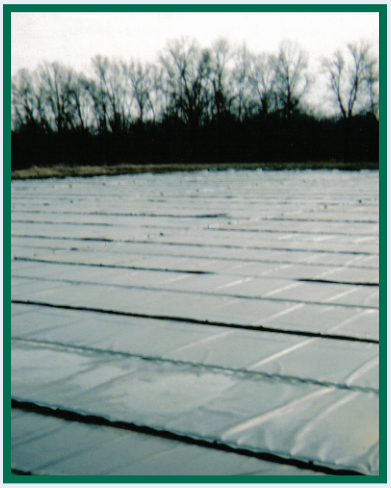
Case Study: Jasonville, Indiana

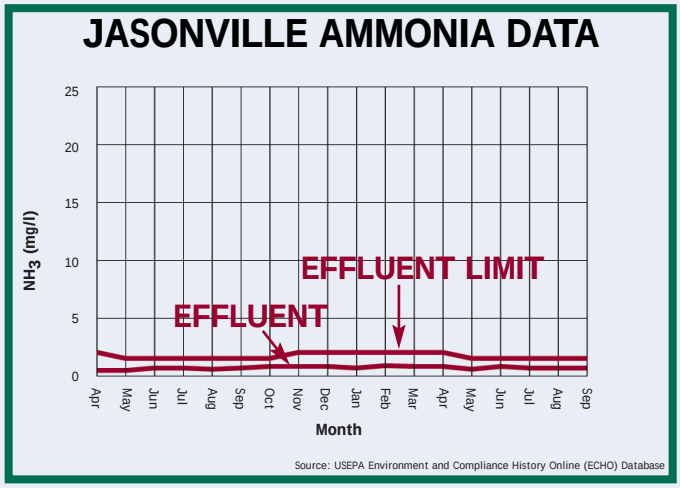
Project Background: The wastewater treatment plant, located in Jasonville, Indiana, was an existing lagoon system that no longer performed to the new environmental regulations for Ammonia. The Ammonia removal process, which is difficult in any wastewater treatment system, is especially complex in cold weather climates like Jasonville.





This system was designed to incorporate the existing lagoons and aeration equipment to create the most cost effective system. There were two existing large wastewater treatment ponds. The entire first pond was incorporated into this design and half of the second pond was used by constructing a berm in that pond. The aeration pond has a detention time of 15.8 days. The aeration cell is partially mixed. New diffused aeration was added to supplement the existing aeration. The third cell is a settling cell with a detention time of 7.4 days. The settling pond is followed by a Lemna Polishing Reactor (LPR) consisting of sixteen media modules for effluent polishing.





Site Performance: The Jasonville facility provides reliable removal of CBOD, TSS and Ammonia over a wide range of operating conditions including high flows, cold operating temperatures and variable loads.

FEATURES AND BENEFITS

Easy to Operate

- Minimal operator requirements
- No complicated sludge handling
- No solids return/recycle
- Start-up and operator training provided

Flexible Designs

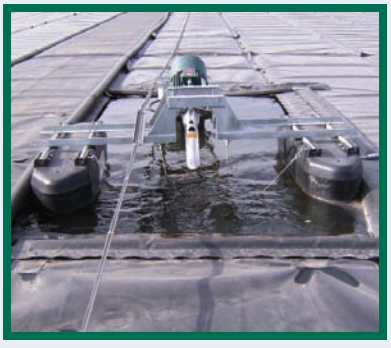
- New or existing lagoons
- Reliable at high or low flows
- Easy to expand for future flows
- Designs for any climate

Affordable

- Small footprint and land required
- Minimal HP required
- Low operator costs
- Simple construction

Proven Technology

- 25 years of experience
- The leader in lagoon nitrification
- Dedicated to the environment



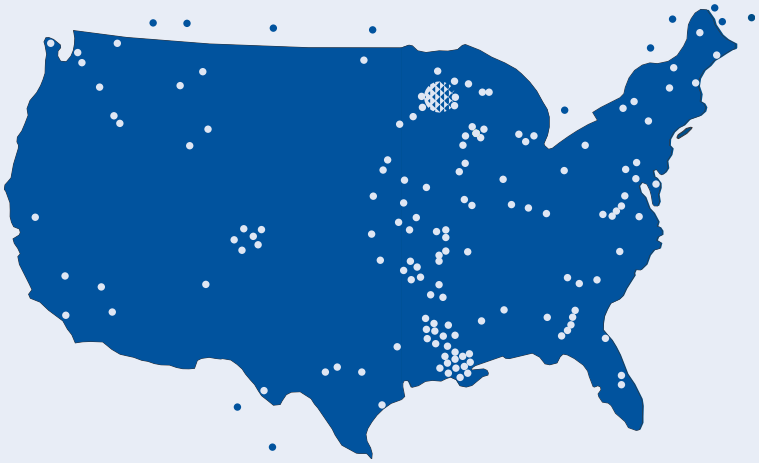
"The city purchased a turn-key wastewater treatment facility over 20 years ago. I would recommend Lemna to any community or industry in need of water treatment." ***Client - J.M., North Dakota***

Wastewater Treatment Experts

Lemna has been the world leader for more than 25 years in high-performance lagoon-based wastewater treatment technologies. We have 100's of treatment facilities with installations on four continents.

Headquartered in Minneapolis, Minnesota, Lemna designs and installs systems for all municipal and industrial applications. Lemna provides a full range of wastewater design and engineering services, backed by exceptional results and customer service.

"LEMNA PROVIDES A SIMPLE SOLUTION FOR WASTEWATER TREATMENT PROBLEMS"



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