

# When “Good Enough” Isn’t Good Enough

CITY OF MARENGO SOLVES WASTEWATER PLANT DILEMMA  
WITH DYNABLEND® LIQUID-POLYMER TECHNOLOGY

By Greg Kriebel



Jay Berman (left), Superintendent of the Wastewater Treatment Facility for the City of Marengo (IL, USA), with Tim Mack, Operator, at the facility's main entrance.

Many times people are satisfied when the performance level of a particular product or the outcome of an activity is deemed “good enough.” Car’s running a little rough and the gas mileage is suffering, but it still gets you where you need to go? Good enough. High-school student gets a C+ in Chemistry when a few more hours of study and a few less hours of Xbox could have meant a B? Good enough. The pattern on those newly hung side-by-side strips of wallpaper don’t quite match up? Good enough.

The problem with this mindset is that after a while you become satisfied with “good enough” and lose the ability to discern when good enough actually isn’t good enough, which results in an automobile breakdown at the most inopportune time, or the discovery that colleges generally don’t offer scholarships in Xbox proficiency.

## The Challenge

In the fall of 2007, the operators of the Wastewater Treatment Plant in Marengo, IL, USA, were beginning to

notice that “good enough” was becoming a common refrain when assessing the performance of the liquid-polymer feed system that was in place at the city’s 900,000 gallons (3.4 million liters) per day facility. This system was used to treat wastewater and played a crucial role in transforming the solid waste and sludge that are collected into a usable end-product.

At the plant in the City of Marengo, which is a growing municipality of nearly 8,000 located about 60 miles (96 kilometers) northwest of Chicago and 15 miles south of the Wisconsin border, the treatment plant moves the wastewater load through a screen, where potentially damaging items like wood, rocks and even dead animals are removed. From the screening process, the wastewater moves into an oxidation ditch and on to clarifiers where the treated water is eventually discharged into the nearby Kishwaukee River. Any solids that remain in the clarifier are either pumped back to the oxidation ditch or moved into a sludge-processing system. In the sludge-processing



The processed sludge is eventually used as a fertilizer.

system, the solid waste is transferred into a tank and then run through a thickening centrifuge, where the liquid polymer is introduced. The thickened sludge is then transferred to an anaerobic digester where the solids are broken down further before being fed to a dewatering process. When the sludge is completely thickened and dewatered it is moved to a storage building before it is taken out and used as a fertilizer.

The performance of the sludge-processing system, however, was beginning to be compromised by the unreliability of the equipment used to feed the liquid polymer to it and “good enough” was rapidly becoming not good enough anymore.

“It was an old liquid-polymer system that was failing a lot and didn’t really function very dependably, and we were afraid that that it would fail completely at some point so we knew we needed to look into getting a new system and upgrade the operation,” said Steve Fiepke, who was

Superintendent of the Marengo Wastewater Treatment Plant at the time.

For suggestions, Fiepke turned to LAI Ltd., Rolling Meadows, IL, USA, a manufacturers’ representative firm that has served the water, wastewater and stormwater markets of Northern Illinois, Northwestern Indiana and Wisconsin since 1958.

## The Solution

When hearing the parameters of what Fiepke and Marengo were looking for, LAI’s Peter Lynch had one suggestion: dynaBLEND® liquid-polymer-blending technology, which is patented by Fluid Dynamics, a division of Neptune Chemical Pump Co, Inc., North Wales, PA, USA.

“I told Steve we could supply a Fluid Dynamics product to test for a couple months, and then a few weeks after that they placed an order for one,” said Lynch.

The dynaBLEND meets the needs of the Marengo wastewater plant because, as the range of available blending polymers for sludge processing has grown over the years, the dynaBLEND system has been designed to effectively activate all types of liquid polymer. On top of that, the dynaBLEND’s non-mechanical mixing chamber delivers an unequalled degree of reliability over many of the mechanical technologies that are on the market today. The system’s injection check valve has also been designed with easy disassembly and inspection in mind, eliminating a maintenance concern that can plague other systems.

Aesthetically, the dynaBLEND measures only 24-inches deep by 24-inches wide by 68-inches (61 x 61 x 173 centimeters) tall, which eliminates much of the clutter that can be found in the sludge-processing area of a wastewater-treatment facility, while also making it safer for the facility’s employees. The liquid polymer can be pumped directly into the dynaBLEND from a storage vessel such as a 55-gallon (208 liter) drum on an as-needed basis. This helps reduce the chances of a polymer spill occurring.

“The dynaBLEND operated very well when we tested it,” said Fiepke. “It was much easier to set the dials for the feed rates for the dewatering or thickening processes. We also noticed a reduction in the amount of polymer we were using for those processes, so there was a monetary savings there, and anytime you can save money on a chemical, that’s a plus. After a couple months of testing it, we decided that it was something that we were interested in and decided to purchase it.”

## Inside the dynaBLEND® System

Fluid Dynamics developed the high-energy, non-mechanical dynaBLEND® liquid-polymer activation and blending technology, which proved to be a revolutionary advancement in polymer-activation and blending performance. The key to the success of the dynaBLEND system is its HydroAction Technology, which produces in excess of six times the mixing energy per unit volume than a comparable-sized mixer.

There are three stages in the operation of the HydroAction Technology:

- **Stage 1:** A pressure drop across the specially designed variable-orifice water-control valve produces a high-velocity water jet. This water jet, which travels at approximately 70 feet per second, is aimed directly at, and impinges on, the polymer as it enters the mixing chamber. At this point, the only point where high energy exists in the mixing chamber, the polymer is coiled up and not susceptible to damage.
- **Stage 2:** In the dynaBLEND's concentric mixing chambers, the newly blended polymer recirculates multiple times for additional exposure to non-damaging turbulence, completing the blending process. This recirculation ensures that polymer solution is present directly after the point of neat, concentrated polymer injection for an ideal activation and blending environment.
- **Stage 3:** The mixing energy then naturally diminishes in the dynaBLEND's concentric chambers, while the flow path through the concentric chambers further ensures optimum polymer performance by preventing polymer from short-circuiting the three-stage process.

This three-stage mode of operation ensures that the dynaBLEND induces high mixing energy without the use of mechanical impellers, which could cause polymer damage and gelling. Preventing polymer gelling and damage maximizes polymer investment by reducing polymer use.



L4-P / L6-P Series dynaBLEND®



Tim Mack adjusts the dynaBLEND's flow rate.

As it turns out, one of Fiepke's last major decisions as the head of Marengo's wastewater treatment plant was to incorporate the dynaBLEND system into the city's wastewater-treatment processes. In May 2008, he departed Marengo for the Wastewater Foreman post in the Village of Algonquin, a larger suburb about 20 miles (32 kilometers) closer to Chicago than Marengo. Upon making the move, Fiepke was pleased to discover that Algonquin's Water Department, which handles a total of around 3.5

million gallons (13.2 million liters) of wastewater per day at its treatment plant, employs a pair of dynaBLEND systems, one for the dewatering process and one for the thickening process.

While Fiepke departed Marengo for Algonquin just a few months after the dynaBLEND system was installed, the person that has benefited from Fiepke's foresight has been Jay Berman, the new Superintendent of the Marengo Wastewater Treatment Plant.

"I was not familiar with the dynaBLEND system when I got here, but it's been operating great," said Berman, who is in his third year on the job. "It delivers the polymer at either a low-flow rate or high-flow rate, is pretty much maintenance-free, which is nice, it's easy to operate and troubleshoot, and, perhaps best of all, it's a workhorse. I have no negative things to say about it since I've been here."

In addition to the reliable operation of the system, Berman is also pleased with the money the dynaBLEND has saved the City of Marengo in polymer costs.



The staff at Marengo's wastewater treatment facility will add a second dynaBLEND system during the plant's upgrade that is scheduled for the second-half of 2011.

"The condition of the sludge that we're trying to thicken or dewater makes a difference in polymer usage," said Berman. "There are times where we save a lot on polymer, but the dynaBLEND does the job no matter what type of sludge we're handling."

## Conclusion

When the performance of a piece of equipment begins to degrade, the user has three options: repair it, live with it or replace it. Too often, "good enough" becomes the default position in instances like this. When Steve Fiepke noticed that the operation of the City of Marengo's Wastewater Treatment Plant was becoming too willing to live with the operational hiccups in its liquid-polymer feed system, he decided it was time to do something about it. That meant it was time to turn to the patented dynaBLEND® liquid-polymer-blending technology from Fluid Dynamics.

While Fiepke has moved on to another municipality since the dynaBLEND system was installed, the people of Marengo and his replacement, Jay Berman, have continued to reap the benefits that the dynaBLEND has brought to the city – and will continue to bring in the future.

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