

# Ag Nutrient

# MANAGEMENT

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## Filtration yields clear water

Learn how this producer obtained a permit to discharge water from manure on his dairy.

### Inside

#### Diet impacts nutrient excretion

See how changing rations directly impacts the amount of land required to apply the manure produced.

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# Emerald Dairy allowed to discharge water from manure

Ag Nutrient Management Editor Karen Lee

Water is essential to every dairy operation. It is required by cows and crops and also used in many daily farm tasks. However, when excreted in manure it quickly becomes a nuisance, especially in wet, humid climates.

Filtration systems have been used for decades in municipal wastewater treatment facilities, food processing plants and gas drilling operations. Now, they have finally made their way into the dairy industry.

John Vrieze, a dairy producer from northwestern Wisconsin, was one of the first to pilot a reverse osmosis and ultra-filtration system created by Integrated Separation Solutions (ISS) of Madison, Wisconsin, on his 1,600-cow Emerald Dairy. As of January, he is permitted to discharge the clear water from this system into a nearby waterway, significantly reducing the amount of manure needing to be stored and hauled on his farm.

"It makes sense to look at the technology to dewater manure,"

Vrieze says. "You're left with the same nutrients but can reduce the volume by 40 to 50 percent."

Because of the humid climate in the Midwest, there is little to no evaporation of the water in manure. That makes it very difficult to spread in the fields, especially when there's just a short window of time to maximize the nutrient uptake of the soils while balancing other weather conditions.

"My colleagues in the West and South look to irrigation," Vrieze says. "But irrigation is only a small fix to our problems here in the Midwest. We still have to store it in our lagoons seven months of the year."

"The capital cost of building these structures can be enormous," he adds, citing liners and covers that are, or will soon be, required depending on the location.

By opting for the ISS Nu-Way system and removing 40 percent of the manure as water, Vrieze would be able to build a lagoon 40 percent smaller in size or increase his herd size by 40 percent without requiring additional manure storage.

This year, he is simply pleased to make fewer trips to and from the fields. "It allows me to use 12,000 gallons of manure to raise a crop of corn silage instead of 20,000 gallons," he says. With less to haul, he can also move it greater distances.

After receiving the discharge permit this winter, Vrieze did see a reduced volume of manure when hauling this spring; but he is really looking forward to a much larger reduction in the fall.

The four-phase ISS system also provides this dairyman the ability to segregate different parts of manure and utilize end products that vary in their nutrient content to best fit a field's specific needs.

## Putting the process into play

Vrieze met with ISS for the first time in January 2006. Within six months the company started deploying equipment and everything was on the farm by October. After one year of research and development the process was operational in October of 2007. Since it was a pilot project, ISS funded the equipment and research and development costs, while Vrieze covered the operational costs of the system.

Unfortunately, after everything was in place, it took an additional 15 months to obtain a permit from the Wisconsin Department of Natural Resources (DNR) allowing Vrieze to discharge the clean water from the system. During that time, the filtered water was being sent back into the lagoon.

The water from the filter is now released into a 1,500-foot grass water strip that leads into an erosion control pond. From the pond, water is discharged into a nearby creek and wetlands. Due to three years of dry weather in the area, the clean water doesn't get more than 700 feet down the strip without evaporating or integrating into the soil, Vrieze says.

With the discharge permit in place, ISS is able to run the equipment 24/7 and fully identify the value of its product. It is also able to continue the research and development phase, finding ways to reduce the system's operational costs. In addition, Vrieze and ISS are attempting to find a way to get all the nutrients in their driest form and push the 40 percent water reduction even higher.

## Hurdling the obstacle

The biggest hang-up in the entire process was obtaining the permit from the DNR, he recalls. The company was very good to work with, as was the Environmental Protection Agency (EPA) at the federal level.

"We started interacting with the DNR three years before we got



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"It makes sense to look at the technology to dewater manure. You're left with the same nutrients but can reduce the volume by 40 to 50 percent," says John Vrieze.

Photos by Karen Lee.

the permit," Vrieze says. "Fifteen months before, we proved what we could do."

"We're no different than a municipality," says this dairy producer. "They clean and discharge water all the time."

Because of this hold-up both Vrieze and ISS grew rather frustrated. In that time, more dairies could have caught on to this new technology and implemented it in a better financial market than what they face today. With more systems in place, the greater the benefits seen by dairies and the environment around them.

"Environmental regulators should pave the way for this technology. Instead, they've become a barrier," Vrieze says.

### Catching on

"I see the technology now employed by dairymen. There once were the first parlors and pipelines," he says. "I believe this technology will be looked at in the same vein."

*Continued on page 12*

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## Emerald Dairy allowed to discharge water from manure, cont'd from page 11

As the government looks to regulate greenhouse gases, Vrieze says enormous lagoons may be in trouble if air emissions are based on square footage.

In addition, water regulations require six months of storage. In normal years, his area can receive 31.5 inches of precipitation. That's three million gallons of added water a year to be kept in lagoons, he says. Plus, the organic matter from bedding soon forms a crust on the lagoon and little of that water will evaporate out.

Vrieze installed covers on the lagoons at both of his dairies to keep the rainwater out, but the technology to dewater manure and discharge the clear water back into the environment will also combat this problem.

Not only does this technology reap financial and time savings for Vrieze, but it also helps with public relations.

He hosts approximately 5,000 people each year for dairy tours, many of which are consumers. By demonstrating that his dairy



John Vrieze found another use for products released from the filtration process – growing algae to produce biodiesel to fuel farm equipment. Photo by Karen Lee.

is environmentally proactive, it gives them a positive feeling of dairies at that level.

“Until they are accepting of dairies this size, anything that is proactive and protects the environment is good for us and the industry,” Vrieze says.

After a full year of running this complete system as it was intended, Vrieze plans to look at the feasibility of it at his second dairy in nearby Baldwin. However, he foresees the economics won't pencil out as well there

because that location has 600 fewer cows and more land base nearby. For him, the majority of the savings comes in reduced manure-hauling expenses.

However, it is a very viable option for dairies similar to Emerald Dairy. Vrieze says that now he's been granted a permit, it will be easier for other dairies to implement this system, especially in parts of the country where the EPA is the regulating authority. **ANM**



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