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Answering the challenge

PART OF THE BAY SOLUTION: Ron Kreider, president and CEO of Kreider Farms of Manheim, Pa., hopes the bioreactor that's under construction in the background proves to be a big answer to the Chesapeake Bay's nutrient management problem, for both agriculture and municipalities.

By **JOHN VOGEL**

WHY would a farmer open the gate to a \$7.75 million, 10-year state loan to a Colorado-based company for overhauling the dairy manure facility and hauling away nutrient credits?

That's what we asked Ron Kreider, president and CEO of Kreider Farms of Manheim, Pa.

In November, old calf hutch facilities between the dairy barns were bulldozed for the newest innovation. Construction of a manure separation and treatment renovation project owned by Bion Environmental Technologies got under way after more than five years of planning, permitting and development of a state nutrient credit-trading program.

Key Points

- Kreider Farms allowed Bion to retrofit a \$7.75 million nutrient trading project.
- Goal for project is to make manure management system more efficient.
- The farm is in the bull's-eye of the Chesapeake Bay cleanup program.

Kreider's answer was simple: "We're trying to make our manure management system more efficient, to remove more nitrogen and phosphorus from the liquid going to the three-stage lagoon.

"Our whole goal is to get the effluent as clean as possible to irrigate with center pivots. We're not doing this to expand beyond 1,200 cows," he emphasizes.

"We hope it'll make manure management easier for us. Beyond that, we [Kreider Farms] won't see much economic benefit."

Nutrient credits sold under the state program will go to Bion. Down the road, however, the farm stands to benefit if the recycled cellulosic solids fire up a steam boiler.

Prime Bay cleanup pilot site

The Lancaster County farm sits dead-center in the "bull's-eye" of the Chesapeake Bay cleanup program. With 2,500 acres, 4 million egg-laying chickens and 1,200 milking cows, it's a target — of eco-friendly innovation for man, bird and beast.

Innovation is nothing new at Kreider Farms. This bustling business pioneered de-

velopment of chick-to-egg housing and processing facilities with enhanced bird welfare and food safety. Cow comfort reigns in the dairy barns, and generates high-quality milk for Kreider Farms' ice cream plant. Dairy manure solids and poultry manure are blended and composted, then applied as fertilizer or wholesaled. Composting is a business in itself: about 50 tons of manure are processed per day.

"Bion's technology may be a big part of the Bay solution," Kreider hopes. "We gave them a spot to put it in.

"Municipalities can buy the nutrient credits at a less expensive rate. Or they can spend more expensive dollars to solve their water-quality compliance problems."

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MANURE SYSTEM RETROFIT: The farm's old calf-raising facilities were cleared away to make room for the solids-separating screw-press facility. Remaining effluent will be piped to the receiving station being built at the base of the reactor-to-be (right).

Manure to pay via credits

By JOHN VOGEL

CONTRACTORS broke ground in November at Kreider Farms' dairy facility at Manheim, Pa., to install an innovative \$7.75-million nutrient management system to be paid for by nutrient, or manure, credits. The equipment and technology is owned by Colorado-based Bion Environmental Technologies.

Nutrient credits saved with the biological processing plant will be sold under Pennsylvania's new nutrient-credit trading program. Bion will use those credits to pay off the 10-year state PENNVEST, or Pennsylvania Infrastructure Investment Authority, loan.

Phase one construction is expected to be complete by March. The nutrient recovery system fits into Kreider Farms' existing manure-handling schematics. Once it's up and operating, manure from the remaining dairy facilities is expected to be added into the system.

This farm's manure handling system was a perfect site for the Bion project. "We're not sand and we're not flush," explains Ron Kreider, the farms' president and CEO.

Turning manure credits to money

In brief, manure from the 1,200-cow main freestall barn will be collected three to four times a day, and automatically put through a screw press to separate out cellulosic material. Liquids will flow to the farm's 1-million-gallon concrete manure storage tank that will be modified and covered to serve as an aerobic microbial bioreactor.

In the patented process, microbes will aggregate and convert nitrogen and phosphorus nutrients into particulate forms that'll be centrifuged out, "with substantial reductions in nitrogen, phosphorus, ammonia and other greenhouse gases," says Jeremy Rowland, Bion's chief operating officer. The cellulosic biomass and other solids will be used for a yet-to-be-determined renewable energy project.

Bion officials claim the process removes 70% of N and 75% of P from the waste stream, compared to none via anaerobic digestion. The process also generates three to five greenhouse gas (methane)



FIT TO BE COVERED: This million-gallon manure storage structure is being retrofitted so aerobic microbes can filter out phosphorus and nitrogen.

Key Points

- Manure separation system costs to be recovered via nutrient credits.
- Bacteria to help remove 70% of N and 75% of P from waste stream.
- Technology plus credits can pay for themselves without subsidies.

credits per cow, a 97% ammonia reduction plus an 80% reduction of hydrogen sulfide.

The phase one project may also yield up to 60,000 carbon credits, estimates Rowland. And he adds, "This technology can be installed and paid for without subsidies."

The Pennsylvania Department of Environmental Protection, or DEP, approved the nutrient credit certification plan for recovering about 130,000 N credits and 16,250 P credits. Verified nutrient credits will then be sold to offset the discharges of regulated nitrogen sources (municipalities) facing much higher remediation costs, such as municipal wastewater treatment plants in the Susquehanna River watershed.

Game-changing innovation

The Lancaster County facility was lauded by state agriculture and environmental officials at the groundbreaking ceremony.

State DEP Deputy Secretary John Hines noted that "Technology is the solution to the Chesapeake Bay's tributary strategies. This is a game-changer, and the direction we need to go."

State Ag Secretary Russell Redding pointed out that technological improvements must be economically justified at the farm level to be viable. "You don't get clean water without viable farms."

Pennsylvania State Sen. Michael Brubaker also strongly supported the project. The Senate Ag Committee chairman and soon-to-be chairman of the tri-state Chesapeake Bay Commission added: "We cannot fail to remove billions of pounds of nitrogen from our waters. This is one of the answers."

Phase two plans for developing a cellulosic biomass renewable energy facility that incorporates Kreider Farms' four poultry operations are under way. It would, according to Bion projections, take 4 million pounds of nitrogen out the local environment from about 4 million laying hens. Those nutrient credits would also be sold.

The bottom line is that the farm facility will help local municipalities comply with the increasingly restrictive nutrient management regulations coming upriver from Washington, D.C.

For more details visit www.bionpa.com.