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Phosphorus, a finite nutrient, is in human waste. The York plant will harvest it for fertilizer.

DAVID SWANSON / Staff Photographer

Pellets of Crystal Green — the result of Ostara Nutrient Recovery's facility, at top, at the York plant — are held by engineer Rhonda Hyslop. The process takes phosphorus from wastewater and converts it into fertilizer.

Plant turns sewage into a resource

By Sandy Bauers
INQUIRER STAFF WRITER

YORK, Pa. — The latest substance from the York sewage treatment plant isn't stinky sludge or bubbly wastewater.

It's little white pellets, about the size of small seeds. And they promise not only environmental benefit but real money.

The pellets are fertilizer, and a formulation that incorporates them, produced by an Allentown company, is being tested at Longwood Gardens in Kennett Square.

The pellets are also being touted as a way for the plant to meet stricter environmental limits for discharge into nearby Codorus Creek — and ultimately, the Chesapeake Bay, which suffers from an excess of nutrients.

The technology, by the Canadian firm Ostara Nutrient Recovery Technologies Inc., is being introduced Thursday. It also will help the York plant save about $90,000 a year, including lower operating costs and revenue from fertilizer sales.

For York, and other sewage plants nationwide, environmental rules are becoming ever stricter and more costly.

This is especially true in Southeastern Pennsylvania, where most streams are considered "impaired" for nutrients, said Jenifer Fields, water-program manager for the Department of Environmental Protection's office here.

So the double holy grail for plants is to eliminate as much waste from waste as possible, then turn it into a resource.

York's "new" source of phosphorus comes just as scientists are beginning to worry that the

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Treated water from the plant is emptied into the Codorus Creek in York, Pa. The plant's new limit is 0.8 parts per million of phosphorus. The water eventually reaches Chesapeake Bay.

Pellets

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world is running out.

Phosphorus is mined mostly from five countries, including the United States, Morocco, and China, and it is finite.

Researchers are beginning to speak of "peak phosphorus" the same way they speak of "peak oil" — a time when the resource is so scarce it is no longer economically feasible to extract it.

Yet phosphorus runs rich in the veins that are the nation's waterways. Storm water flushes it from farm fields, and sewage pipes drain it from our homes and businesses.

York didn't have to make any capital investment, but it pays a monthly fee based on performance.

Overall, excess nutrients, including phosphorus, are one of the main culprits in polluted waterways.

The nutrients cause excess algae growth, which consumes the oxygen that fish and other marine organisms need.

In the waste stream, phosphorus has been removed from laundry detergents and, most recently, from dishwasher detergents. But it is in the plants we eat, and thus the waste we excrete. Garbage disposals in sinks, which gobble leftover veggies and the like, also are a source of phosphorus.

In Chesapeake Bay, 22 percent of the phosphorus comes from wastewater facilities, records show. Fertilizers and manure are other major sources.

York's previous limit was two parts per million of phosphorus in its wastewater stream. Its new limit will be less than half that — 0.8 parts per million.

York plant manager Steven E. Douglas said his staff was investigating how to cut phosphorus output when they learned of the Ostara technology, which is used at only two other places in the United States — Portland, Ore., and Hampton Roads, Va.

Portland, which has a different financial arrangement with Ostara, paid $2.5 million for the process and expects to reach payback in five years because of energy savings and proceeds from the fertilizer, said Mark Jockers, spokesman for Clean Water Services, the utility there.

He said the plant, which drains into the Willamette River watershed, has one of the strictest phosphorus limits in the U.S. — 0.1 parts per million.

The plant was already meeting that, but it opted for the Ostara process because "it was a smart business decision."

York today will publicly announce the new phosphorus-extraction facility, built in a 1950s structure that used to house an incinerator.

Water that goes into the plant is treated in the normal way, at first. The solids are settled out, bacteria are used to "eat" some of the nutrients, and the resulting "biosolids" are squeezed of water.

The dry stuff is applied to farmlands or used as fill to thwart acid-mine drainage. But the squeezed water — like wine from grapes, says Ostara chief technology officer Erin Brisson — is superrich in phosphorus and used to go back through the plant to be retreated.

Now, it goes into huge funnel-shaped tanks, 24 feet high and 12 feet in diameter at the top.

The water is injected with a chemical — magnesium chloride — that forms crystals with the phosphorus. In five to 20 days, the crystals are large enough, and they are shot off through pipes to a dryer.

They emerge as dry pellets — Ostara has dubbed them Crystal Green — and are bagged.

The money in the financial arrangement between the York facility and Ostara goes both ways. York did not have to make any capital investment, but it pays a monthly fee based on performance. Ostara operates the process and writes a check for the fertilizer it takes away to sell.

Next, the pellets are sent to the Allentown fertilizer company, J.R. Peters, where it is blended into a commercial product, Jack's With Crystal Green.

Mixed in various formulations targeted for specific applications, it became available to garden centers in May, said vice president Cari Peters.

Environmental advocates have said simply producing new fertilizer from the phosphorus will not necessarily help streams if the fertilizer just washes back in.

But proponents say Crystal Green has slow-release properties that make it stay in the soil.

Meanwhile, the staff at Longwood Gardens has been using it on a trial basis.

Matt Taylor, research horticulturist at Longwood, said he was testing the fertilizer not only because of its chemical content, but because it is made locally from a waste product, which fits into Longwood's sustainability goals.

Back at the York plant, workers have already used it to feed the azaleas just outside the front door.

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