

By Neda Simeonova

from waste to resource recovery

Stickney WRP to upgrade solids removal process, develop a phosphorus recovery system

NAME:

Stickney Water Reclamation Plant, Metropolitan Water Reclamation District of Greater Chicago

LOCATION:

Cicero, Ill.

PLANT SIZE:

1.4 billion gpd

INFRASTRUCTURE:

Sewage and sludge screens, final settling tanks, sewage pumps, blowers, centrifuges, anaerobic digesters



The Stickney WRP is the largest wastewater treatment facility in the world.



Upgrades will reduce solids carryover in recycle streams and thicken solids more efficiently.



A view of the pumps and blowers

Owned and operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRD), Stickney Water Reclamation Plant (WRP)—the largest wastewater treatment facility in the world—is subject to continuous rehabilitation and upgrading. Situated on 413 acres, Stickney WRP serves 2.38 million people in a 260-sq-mile area, including the central part of Chicago and 43 suburban communities, processing 1.4 billion gal of wastewater per day.

“Stickney actually consists of two plants: The west side portion of the plant was placed into service in 1930 and the southwest portion of the plant was placed into service in 1939,” said Kathleen Meany, board president of MWRD.

Over the course of its service, Stickney WRP has undergone significant improvements to ensure safe and uninterrupted operation.

Solid Improvements

Currently, the solids removal process at Stickney WRP is undergoing a major upgrade, according to MWRD Executive Director David St. Pierre.

“The primary sludge and waste-activated sludge streams, which are currently combined, are being separated for more efficient thickening prior to digestion. Primary sludge will be thickened in a new facility that houses eight 80-ft-diameter gravity concentration tanks with a biofilter for odor control. Waste-activated sludge will be thickened in 16 new high-tech centrifuges that have nearly three times the throughput and require half of the power draw as the centrifuges being replaced,” St. Pierre said.

New raw sewage and sludge screens will remove inorganic debris, protecting downstream equipment and improving the quality of the final biosolids product. These upgrades will reduce solids carryover in the recycle streams, thicken solids with greater operational and energy efficiency, and improve feeding operations to the anaerobic digesters.

Path to Resource Recovery

Charged with ensuring compliance, MWRD also is working to transform Stickney WRP from a waste facility into a resource recovery facility.

“As part of our initiative to reduce phosphorus loads to the Illinois River basin and to comply with future NPDES permits, MWRD began a preliminary investigation in October 2011 and began pilot testing the enhanced biological phosphorus removal process in one battery at the Stickney WRP in May 2012,” St. Pierre said.

The pilot test process has operated with remarkable stability, showing that lower phosphorus and total nitrogen concentrations have been achieved in the effluent while maintaining nitrification.

This year, MWRD awarded a contract to Black & Veatch/Ostara to develop a phosphorus recovery system at Stickney WRP.

“We anticipate being able to recover about 1,300 tons per year of phosphorus at the Stickney WRP and convert it into a slow-release fertilizer that is a marketable product,” St. Pierre said.

MWRD also has set the ambitious goal of

becoming energy-neutral in the next 10 years. In order to accomplish this, the district is studying process changes and conservation measures that will reduce energy consumption, while implementing new technologies to produce energy on site.

For example, the biogas produced by the anaerobic digesters is used to produce steam for heating at Stickney WRP and provides about 31% of MWRD’s energy needs. The district currently is studying ways to increase biogas production and alternative uses of the biogas. The district also is studying other ways to generate renewable energy, including thermal energy recovery from the heat present in the wastewater itself.

“Through these initiatives, the Stickney WRP could become one of the largest eco-recovery centers in the world,” St. Pierre said.

Funding & Support

Major MWRD capital infrastructure projects are funded through long-term debt via the Capital Improvement Bond Fund, federal and state grants, and state revolving fund (SRF) loans.

“MWRD projects have received significant support from state and regional leadership as the U.S. Environmental Protection Agency (EPA), Illinois Gov. Pat Quinn, Chicago Mayor Rahm Emanuel and MWRD have been working together to reduce untreated storm water overflows into the waterways,” Meany said.

In 2012, MWRD was awarded \$10 million through the Illinois Jobs Now! capital program, which supplemented the \$21 million in engineering and design costs needed to move MWRD’s disinfection facilities forward.

“The governor also directed Illinois EPA and Illinois Finance Authority to expand the SRF program as part of the Illinois Clean Water Initiative,” Meany said. “Last spring, the governor ear-marked \$250 million in low-interest SRF loans for MWRD to move forward with projects crucial for improving the water environment and protecting public health.”

WEFTEC.13 Attendees

In October, Stickney WRP will open its doors to WEFTEC.13 attendees. Guests will have the opportunity to see some of the 96 final settling tanks and stop by the new control room and pump and blower building. They will see the new centrifuge building, the enhanced biological phosphorus removal pilot test in battery D, and construction of a new gravity concentration facility. The tour also will visit the post-digestion centrifuge building, where digested biosolids are dewatered to 25% solids and loaded into railcars for transportation to an MWRD solids management facility. www.mwrdd.com

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