



Sidestream Deammonification Collaboration: Metropolitan Water Reclamation District of Greater Chicago and Denver's Metro Wastewater Reclamation District



LIFT Focus Area Group participants toured a sidestream deammonification pilot facility as part of a LIFT workshop on shortcut nitrogen removal at Chicago-MWRD.

SHORTCUT NITROGEN REMOVAL—NITRITE SHUNT AND DEAMMONIFICATION



LIFT's Guidance Manual on Shortcut Nitrogen Removal includes guidelines for assessing the application of various technologies.

In 2012, the Metropolitan Water Reclamation District of Greater Chicago was zeroing in on better ways to remove nitrogen from their wastewater. It was part of their 10-year plan to become energy neutral. At the time, centrate at their Egan facility had such high ammonia nitrogen loads that it could not be returned to the mainstream without jeopardizing compliance with permit limits. To ensure that centrate management could continue at their Egan site, Chicago-MWRD needed to find a way to drive down ammonia loads—and they began looking at sidestream nitrogen removal technologies as a solution.

They initially singled out the DEMON® treatment system as their top candidate. The technology had proven results, was relatively energy efficient, and the technology could convert ammonia directly into nitrogen gas, so byproducts could be released into the atmosphere without impacting air or water quality. Their intent was to begin piloting the technology first and investigate ANITA™ Mox soon after. That fall, Chicago-MWRD installed a DEMON® technology pilot at their Egan facility and began testing the results.

At the same time, nearly 1,000 miles away, Denver-MWRD, who had implemented sidestream treatment strategies at their Robert W. Hite treatment facility several years earlier, was now beginning to weigh the potential of integrating deammonification into their sidestream treatment facilities. Denver-MWRD, like Chicago, recognized that sidestream deammonification could offer them benefits in terms of compliance with tighter ammonia and nitrogen limits and a reduced energy footprint, and they were also hoping it could help improve the performance reliability of enhanced

biological phosphorus removal in the main process. Denver-MWRD selected the ANITA™ Mox technology for evaluation and also scheduled pilot testing on its centrate stream that fall.

“Knowing that other leading entities are interested in the same technologies and are expending resources on driving innovative solutions is encouraging and provides the support network essential to successfully adopting new innovative technologies and processes.”

JOSEPH A. KOZAK, PHD, PE,
Metropolitan Water Reclamation
District of Greater Chicago

The timing was perfect—earlier that year WRF and WEF had launched a program to help accelerate the adoption of new water technologies. The two facilities were ideal candidates for this program, known as LIFT (Leaders Innovation Forum for Technology), and could benefit from its ability to help utilities align efforts and leverage benefits from each other's studies.

That summer, LIFT formed its first utility Technology Focus Area Group to facilitate research and testing collaboration on shortcut-nitrogen removal. Soon, the group of participating utilities, including Denver and Chicago, began to connect via a series of web seminars.

In December, representative from both facilities were among more than 60 wastewater professionals attending a LIFT Focus Group workshop at Chicago-MWRD who were eager to learn more about emerging nutrient removal processes. Utilities discussed their interest in deammonification and shared results from actual demonstration projects—and as both Denver-MWRD and Chicago-MWRD highlighted their

respective pilot studies, it became clear they shared a common interest.

Denver-MWRD and Chicago-MWRD quickly initiated recurring personal communication and information sharing from their experiences and began participating in each other's studies. Through regular meetings, phone calls, and email, the two utilities were able to discuss everything from pilot study direction and design criteria to infrastructure needs and overall performance. They talked through operational guidelines and process control and troubleshoot problems.

Chicago and Denver continued to share study progress well into 2013 until both studies were completed. This allowed both utilities to use each other's information while avoiding duplication of pilot efforts in order to support the basis for proceeding with deammonification technology selection. They were able to compare and cross check operating requirements, reliability of performance, volumetric efficiency, and control strategies of the two technologies.

Chicago-MWRD moved forward with the design and implementation of a full-scale ANITA™ Mox process at its Egan plant, while Denver-MWRD has benefited from the efficiency of technology evaluation. Through peer-to-peer networking and collaboration supported by LIFT, both utilities were able to reduce research costs, save time, and stretch resources, building confidence in and implementation of new technologies.

The results of their work, along with that of other utilities, helped inform the development of a LIFT guidance manual on deammonification and shortcut nitrogen removal published in 2015. This manual helped provide valuable state-of-the-knowledge information and consensus design and operating parameters to help speed the adoption of this energy- and cost-saving technology. It also helped bridge the gap between research and practice.

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