

## Should we keep DO for nitrification control ?

### The proof is in the Ammonium Electrodes

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#### ABSTRACT

Aeration often is the process that consumes the most energy in a wastewater plant. At the same time it is an essential process to maintain compliance for BOD and Ammonia limits. It thus deserves a lot of attention.

The use of dissolved oxygen measurement to control aeration is widely accepted. The literature has many examples of excellent return on investment in wastewater plants that have implemented this control. There are even theories that a concentration of 2 mg/l is the perfect value. But a DO sensor only tells how much oxygen has not been used in the process and at times this measurement may not bring the expected results. The effluent may end up out of compliance or too much energy can be spent. Examples are available.

As one of the main objectives of the aeration tank is nitrification the measurement of the concentration of ammonium or ammonia provides much better information than dissolved oxygen. Ion Selective Electrodes installed directly in the tank eliminate the need for sampling line and insure an easier integration. Their selectivity, accuracy and lower maintenance make them an attractive solution. As demonstrated at Wheaton and Colorado Springs additional energy savings and compliance are possible when using either ammonia in a cascade loop with DO control or in direct control of the air flow. Direct control either in feed-forward or feed-back provide faster and better response when spikes are present.

The return on investment is very good even on smaller plants and compliance is achieved.

Dissolved oxygen concentration remains an important factor as it affects the quality of the sludge. The control strategy has to maintain it within limits.

#### About the Authors:



**Robert Lagrange, PhD** is a Doctor in Physics from the University of Grenoble, France. After 11 years with Endress+Hauser as Business Manager Water and Wastewater Robert is now working part time as a consultant. Robert presented multiple times at the ISA WWACS and is a member of WEF and AWWA instrumentation and control committees



**Sue Baert, B.Sc.** is the Plant Superintendent at the Wheaton Sanitary District where she started as a chemist became the Lab Manager and wrote the Quality Assurance Project Plan for the stream water quality project, collected, analyzed and submitted the data. She has a degree in Biology/Chemistry from the UW-Lacrosse. Sue is involved with the DuPage Salt Creek watershed group as Vice-President. She is an active member of WEF through the local MA Central States Water Environment Association (CSWEA). She was President of the Illinois section of Central States for a one year term, and then Illinois Trustee to the Executive staff for two years. In all, her career in the water/wastewater section has spanned over 22 years.



**Amanda Poole, M.Eng.** is an environmental engineer at Baxter & Woodman, where she focuses on energy reduction and generation measures at wastewater treatment plants. Amanda has been involved in numerous wastewater treatment plant energy audits and aeration energy reduction projects throughout the Chicago area. Amanda received her B.S. and M.S. in Environmental Engineering from the University of Illinois in Urbana – Champaign. She has been working in the water/wastewater sector for the past 3 years and awaits her P.E. licensure in December 2012. She is an active member of the Central States Water Environment Association.



**David Green, AAS EET** joined Baxter & Woodman in 2008 as a Senior Systems Integrator. Dave's passion for automation and innovation led him to become the Automation Technical Director. He brings over 16 years of experience designing and providing unique solutions to Automated Systems Integration projects. He has quickly become a technical leader in the organization, and has a hunger for learning new technology and finding the best solutions for automation problems.



**Nick Camin, BSEE, MBA** has worked in the instrumentation field for over thirteen years specializing in environmental industry applications for over ten of them. Nick is a graduate of Purdue University with a bachelor of sciences degree in electrical engineering and he also holds a master of business administration degree from Indiana Wesleyan University. With Endress+Hauser he has held the positions of application engineer, project manager, municipal business manager, regional sales manager and currently he is marketing manager for the environmental industry. Nick is a member of WEF and AWWA instrumentation and control committees.