

Methodology to Develop Optimum Control Strategies

Controlling Wastewater Plant Inflows

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ABSTRACT

The Gold Bar Wastewater Treatment Plant (WWTP) operated by EPCOR and located in Edmonton, Alberta, processes 300 million liters of wastewater per day (MLD) on average and serves a population of 800,000. Inflows to the plant come from the City of Edmonton's combined sewer system and they can reach nearly 2,000 MLD during large rainfall events. To regulate all of the flows to the plant, including wet weather flows, four influent control gates were installed. They also redirect excess flow through a screened overflow relief point.

To EPCOR, flow control appeared quite simple at first, i.e. closing or opening the gates to reduce or increase the flow to the plant. However, EPCOR soon had to cope with operational instabilities and flow handling issues. They eventually came to the conclusion that assistance was needed. After attending a Tetra Tech presentation on the successful resolution of similar control problems at the 2013 ISA WWAC symposium, EPCOR representatives asked Tetra Tech to tackle the issues.

Tetra Tech delivered a comprehensive control strategy that ensured flexible dual control (water level and flow) at the plant and optimally handled every fallback scenario. It is both efficient and robust and already includes fine-tuned PID loops. Tetra Tech's methodology has a proven track record and the stable and optimal control strategy has not required adjustments since its implementation in the summer of 2014.

This presentation provides guidelines on the development of efficient control strategies that include smart operating modes, handling of transitions from manual to automatic, bumpless transfers, fallback scenarios, equipment failures, availability issues, etc. It consists of lessons learned from developing hundreds of wastewater control strategies and it is intended for any party interested in resolving flow control issues or developing control strategies.

ABOUT THE AUTHOR

Maxym Lachance, Eng. *is a Tetra Tech project manager who holds a diploma of collegial studies in electronics and a bachelor's degree in automated production engineering (Montreal). He has acquired more than 13 years of experience both as an electronics technician and as an engineer specialized in wastewater instrumentation and control. Mr. Lachance's control solution for the City of Edmonton won two prizes at the 12th edition of the AICQ's "Grands prix du génie-conseil québécois" (the Quebec association of consulting engineers, which recognizes the highest level of quality in consulting engineering. The project also received a 2012 Tetra Tech Technical Achievement Award. Contact: maxym.lachance@tetrattech.com.*