

Aerial view of the city of London, Ontario, Adelaide wastewater treatment operations

London Calling

By Mark Spitzig & Mark Vuksan

Canadian city optimizes facilities with a comprehensive monitoring solution

As one of the largest cities in the Canadian province of Ontario, the city of London is home to more than 300,000 people. As is the case with many municipalities across North America, aging infrastructure presents tremendous challenges that need to be addressed.

Within the city of London, the Environmental Services Department (ESD) Wastewater Treatment Operations Div. manages six wastewater treatment plants located along the Thames River and Dingman Creek, along with 36 pumping stations. The department takes pride in the services it provides to the community. The six plants (Greenway, Adelaide, Pottersburg, Vauxhall, Oxford and Southland), which collectively handle more than 200,000 cu meters of wastewater per day, range in age from 50 years old (Southland) to more than 100 years old (Greenway).

It was essential for the city of London and the ESD to continue providing efficient and cost-effective services to their residents, and the optimization of their facilities was a key component. Instead of being overwhelmed by the challenge, they took it on as an opportunity to make their facilities and services even better.

Starting Point

To begin the plant optimization process, the city researched the benefits of the Process & Systems upgrade program offered by the Ontario Power Authority (OPA) to tap into any available funding. The city started with an assessment of the Vauxhall plant, which included a detailed engineering study (funded by the OPA) to identify the equipment and technology necessary to address the needs of the facility. It was determined that the Process & Systems upgrade program would address energy optimization and, ultimately, plant efficiency utilizing online technology.

The ESD then established Adelaide as an online instrumentation pilot plant, and put out a bid to find a solution partner for the project. Xylem put together a comprehensive monitoring solution that met the plant's needs. The company worked closely with plant technical staff and the local representative organization, SPD Sales Ltd., to determine the

ideal instrumentation and probes to be installed in the channel and insertion mounted at key locations throughout the plant.

The sensors would measure typical parameters such as dissolved oxygen (DO), temperature, total suspended solids (TSS), sludge level, pH and ammonia. All monitoring and online process instrumentation was tied into a YSI IQ SensorNet 2020XT, a universal controller, which was tied into the SCADA system via Profibus DP.

The products offered both short-term ease of installation and long-term benefits. The cabling infrastructure—being able to run one cable that provides both power and data transfer—made sense. The system also enabled the addition of more probes or instrumentation at any point down the road, with minimal interruption to day-to-day operations.

The new network allows the Adelaide plant to tie in complementary, non-Xylem products without any rework or major adjustments.

Optimal Efficiency

Back at Vauxhall, the installation (currently underway) of the online monitoring probes in strategic locations will enable the monitoring of key parameters as often as necessary, allowing the plant to maintain compliance as well as optimize process efficiencies. Much of the new instrumentation provides the ability to set alarms when certain parameters reach predetermined minimum or maximum levels.

Another key component of the Vauxhall upgrade is to install DO analyzers and ammonium sensors in the large aeration basin. These sensors will help trigger additional aeration basin valves, which assist in activating the turn-down capability of the turbo-blower. The preliminary engineering work has estimated that the Vauxhall plant should realize six-figure savings in annual energy costs, given this ability to power the blowers up or down as necessary (the primary outcome of the detailed engineering study completed under the Process & Systems upgrade program).

The versatility of the multi-sensor IQ SensorNet network solved several challenges with a single system. It allowed the city to not only automate



The effluent channel of the Adelaide facility with the effluent probes measuring DO, pH, temperature and TSS

sections of the treatment procedures based on the data collected by the system, which contributes to significant cost savings, but it also enabled multiple probes to be used in a variety of locations throughout the plant, significantly accelerating some of its processes.

The installation of the new TSS probes with automated cleansing also has simplified plant maintenance. Typical cleaning would be a manual process at regularly scheduled intervals, with a plant employee pulling the probe and cleaning it accordingly. The UltraClean (ultrasonic) technology is integrated in the sensor and generates high-frequency vibrations of the optical windows. Ultrasonic cleaning prevents initial biofouling and keeps any accumulation from taking place, freeing up employees to engage in other useful tasks.

Comprehensive Monitoring

As with any upgrade to an existing facility, it is essential to keep the plant running smoothly during the renovation and upgrade process. Limiting rework and downtime as much as possible is critical to making this happen. With the single-wire efficiency of the new system, which incorporated some of the existing components within the plant but also deployed some of the most current, up-to-date technology available, the interference with plant operations during installation was minimal.

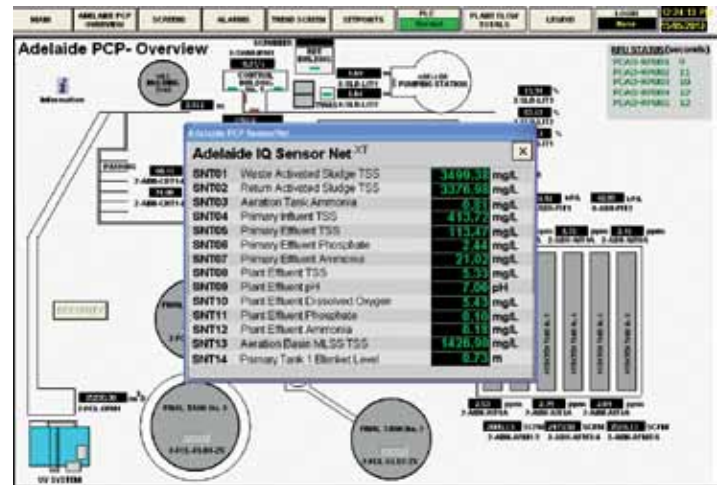
Once the conduit, instrumentation and probes were installed, the new technology was tied into

the existing plant SCADA system via Profibus, which now provides plant personnel with a clear picture of the online monitoring activity.

With the pilot program at the Adelaide facility finalized, the ESD Wastewater Treatment Div. moved on to bring similar changes to the Pottersburg plant. The online monitoring capabilities have been capturing valuable data ever since, and the energy efficiency and subsequent cost savings will pay for themselves within a short period of time.

Due to the early markers of performance and success experienced with the new technology and online instrumentation at Adelaide and Pottersburg, the network, sensors and other instrumentation also have been specified into the additional upgrades to the Vauxhall plant. This Process & Systems upgrade project is currently underway, and the changes should be in place by the end of 2014.

As for the other facilities in the city of London network, it is likely there will be some plant optimization activity with those as well. The remaining three plants have an average age of more than 70 years, so upgrades are sure to come. This type of continuous improvement will enable the city of London and the ESD to continue to keep residents



Screen capture of the Adelaide plant SCADA system PCP overview, showing the various parameters measured via the online monitoring system

happy with the quality of wastewater treatment services they have come to know and expect. **WWD**



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