

## **Modernization of a Municipal Waterworks with SCADA Standardization: Past, Present, and Planning for the Future**

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The need for standardization of its SCADA infrastructure led the City of Guelph, Ontario, Canada (population: 120,000) to develop a set of comprehensive SCADA standards to guide the continuing expansion and upgrading of its water facilities.

Supervisory Control and Data Acquisition (SCADA) has become an important tool for the operation, management, and monitoring of public water utilities throughout North America. SCADA now has an ever-present role that includes looking after all automatic control and alarm management, logging of critical process data, and providing operators with remote access to equipment. However, unlike many other fields of engineering, SCADA is a considerably newer field with many of its major advances only taking place within the last 20-30 years. With SCADA only recently maturing as a technology, most water utilities tend to have wide range of installed SCADA equipment/networks that can vary considerably in terms of age, feature-set, connectivity, and vendor-support. In addition, most systems have been built piecemeal over the years by a wide variety of contractors/vendors, each with their own programming approach. The result: many water utilities now find themselves with complex systems are often difficult to manage in terms of operations, maintenance and overall system robustness.

Five years ago, the City of Guelph realized that a new approach to SCADA was needed for its waterworks. The SCADA equipment they had worked, but it was difficult to maintain in a consistent fashion and it required a large ongoing investment in terms of staff training, staff time and the use of external consultants. Equipment such as Historians, HMIs, OITs, PLCs, RTUs and SCADA network infrastructure came from a variety of vendors and each individual piece of equipment had its own custom programming. Furthermore, whenever additional equipment was brought on line by the City, considerable internal resources had to be spent to integrate it into the existing SCADA network. These considerations, as well as the increasing need for data-logging to meet regulatory requirements, drove the need for a more uniform SCADA system.

With this in mind, the City of Guelph undertook a plan to develop and implement a set of SCADA standards documents, which would be used to guide how SCADA was to be implemented for all new infrastructure. The City also embarked on an aggressive capital improvement plan to upgrade all existing SCADA equipment and programming to these new standards. Furthermore, the City began using its new SCADA standards as part of the tender documents for all new capital projects so that contractors would be required to follow them as part of their scope of work.

This presentation will focus on the steps the City of Guelph Water Services Department took to develop a set of comprehensive SCADA standards, the successes/challenges from implementing them, and how

the standards were adopted as part of the workflow for all new capital projects. Comments will be made on which standards documents (tagging, hardware selection, programming standards, etc.) were most useful in practice and what aspects of the system may be left up to the discretion of the system integrator. Four short case studies will illustrate how the City applied the new standards to existing facilities in order to upgrade them in an organized manner while controlling cost and risk. A fifth case study will outline how the new standards were applied to one of the City's brand new waterworks facilities.