



## VTScada Software, PLCs & Spread Spectrum Radios

### An effective combination for water/wastewater monitoring & control in Quispamsis, New Brunswick

By Christopher Little

For many years the Town of Quispamsis, New Brunswick shared their water/wastewater infrastructure with the nearby town of Rothesay. By 2004, a steady increase in population led to the decision to implement a dedicated Supervisory Control and Data Acquisition (SCADA) system for Quispamsis. The primary challenge was to perform reliable monitoring & control of seventeen remote sites spread across a wide area with steep hills and valleys. CBCL Ltd, the integrator selected for the project, upgraded the remote telemetry units (RTUs) at each site so they could communicate with the main office via a new network of spread spectrum radios. To tie the system together, they selected VTScada software from Trihedral Engineering Limited which they had been using successfully since 1995. In this article, CBCL Senior Automation Specialist Marc Arsenault describes some of the highlights of this project.

#### The Town of Quispamsis

The town of Quispamsis is located along the Kennebecasis and Hammond River waterways in Southwestern New Brunswick. In the language of the local Maliseet First Nation, the name Quispamsis means "little lake in the woods". By 2004 the town surrounding that 'little lake' had grown from 8,446 residents in 1991 to over 13,760 making it the provinces' most rapidly expanding municipality according to Statistics Canada. In 2002, CBCL Ltd., an engineering firm, conducted a Regional Wastewater Feasibility Study for the towns of Quispamsis and Rothesay which were sharing water/wastewater infrastructure. Following the release of this study, it was decided that it was time for the two towns to monitor & control their own sites using their own Supervisory Control & Data Acquisition (SCADA) systems.

#### Physical Infrastructure

As part of this separation, the town of Quispamsis wanted to incorporate into their new system seventeen remote water/wastewater management sites. These are spread out over twenty-five square miles of steep hills and deep valleys. These sites included remote well houses, a series of wastewater pumping stations, the newly upgraded wastewater treatment facility, and a new water reservoir. The sites were originally being monitored by MOSCAD remote telemetry units (RTUs) which communicated with the main office via a licensed UHF radio frequency.

#### CBCL Ltd.

By August 2004, CBCL Ltd. was awarded the design and implementation (programming and commissioning) of the system. Marc Arsenault was team leader of the project. "Our Saint John office has historically done a lot of work for the town. As far as securing the work, our expertise and past experience spoke for itself".

#### Design

CBCL spent the next two months designing the new telemetry system, selecting monitoring equipment and RTU assemblies/enclosures. One of the top priorities was to eliminate the expense of the licensed radio frequency they had previously used to relay information to the main office. "A cellular based system would have been more expensive given that this was a real-time monitoring system and data charges are usually billed on a 'per megabyte' basis. Leased line systems typically have a high monthly leasing rate typically billed on a 'per kilometer' basis." It was therefore decided that the licensed radio grid would be replaced by a network of Microwave Data Systems - Transnet 900™ spread spectrum radios. Although more time consuming to set up, due to the necessity of keeping clear lines of sight between transmitters, they provide a more reliable signal across hilly terrain and are more resistant to external interference. Best of all, this approach used non-licensed radio frequencies and carries no ongoing monthly fees to operate.

For this approach to work, they first needed to replace the existing RTUs that provided monitoring & control at each of the existing remote sites. "They were sharing a SCADA system with the town of Rothesay and they wanted to operate their own. What we did as part of the overall system was to remove the few existing Motorola Moscad RTUs and install Control Microsystems SCADAPack RTUs into these sites plus all the additional sites they wanted to monitor." One of the reasons for replacing the existing RTUs was that they were primarily designed to work with the UHF radios they wanted to substitute. Plus, replacement components for the existing units were expensive and harder to obtain. SCADAPacks, on the other hand, were available locally, easier to program, and integrate easily with spread-spectrum radios. "It seemed to be the right way to go."

#### VTScada Software

The last piece of the puzzle was a SCADA software package that could communicate with the new radios and RTUs plus other common brands of hardware that the town might choose to add to the system in the future. This software would also need to be user friendly enough to allow city developers to add, remove, and reconfigure hardware themselves as the system continued to grow and evolve. CBCL had been creating water and wastewater systems for municipalities since 1995. It was at that time they started using VTScada Human Machine Interface (HMI) software from Trihedral Engineering limited. "Rob Legg, who used to work here, knew of Trihedral Engineering and we decided to use their software for one of our projects. That goes back to the DOS days. I've been working with VTScada since it came out." Trihedral went on to use VTScada as the foundation for its VTScada software which was developed specifically for the water/wastewater industry. VTScada includes features such as industry-specific reports, auto-generated graphic displays, and automatic historical data logging.

VTScada is a trademark of Trihedral Engineering Limited