# Use of Custom Code Generation Tool Allows Municipality to Rigidly Enforce Water/Wastewater SCADA Standards

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## FORMAT

6-12 page paper plus 30-minute presentation

## KEYWORDS

PLC, Technology, Modular Programming, Programming Techniques

## ABSTRACT

The use of automation in the form of SCADA (supervisory control and data acquisition) systems is one of the cornerstones of operating a modern municipal water/wastewater utility.  These systems are, however, fraught with a myriad of options and complexity that can make any standardization effort a daunting challenge.

In early-2010, Halton Region's water/wastewater department embarked on a pilot project to develop an automated code generation tool to help with some of the more tedious aspects of SCADA standardization, namely the creation of PLC data tags, HMI tags, and the creation of the base functionality for PLC programs.  By automating much of the grunt work associated with programming these systems, the Region was able to free up programming resources and ensure better compliance with their standards.

The software tool, which was developed in house, takes the form of a Windows application which has both a "templates" and a "project" editor. In the templates editor, the tag fragments that make up the Region's extensive SCADA tagging standard and standardized PLC code fragments are defined.  In the project editor, individual pieces of equipment such as pumps, blowers, and analog I/O points for each PLC processor are then defined by the user.  Once a project file is created and saved, an automated script then then auto-generates shell PLC programs with base functionality and a HMI tag lists in the form of CSV (comma separated values) files.  These files are then imported into their respective programming environments so the programmer can focus on developed higher-level design tasks like automatic sequence logic and graphical screen design.

This paper will give an overview of how the Region developed the software tool, how it was developed with the Region's specific in-house requirements in mind, and lessons learned along the way.   Also covered will be how tool was used to take advantage and support advanced PLC programming techniques such as User Defined Types, Add-On Instructions and logically separated tasks, programs and subroutines. The paper concludes with insight into how the tool is being used to help the Region to both enforce and maintain its own SCADA standards for both new and retrofit projects.

**About the Author:**

 **Bob Loncar** is the SCADA Programmer at the Regional Municipality of Halton.  He has over 15 years of experience in the Water/Wastewater automation field.  He has been responsible for the creation and maintenance of programming standards for the City of Orlando FL, Jefferson Parish LA, The Region of Niagara Ontario, The Regional Municipality of Halton Ontario and Haldimand County Ontario.  He is currently involved in several pilot projects using higher level programming tools to enforce and maintain SCADA programming standards.