SIEMENS

SITRANS LUT400

Taking the uncertainty out of pump control with new ultrasonic controller

With a population of over 800,000 residents, the growing city of Edmonton, Alberta, Canada requires modern, efficient wastewater treatment. One recent solution for this city's wastewater collection system is SITRANS LUT400, the newest ultrasonic level controller from Siemens. With the installation of this new device, one of Edmonton's pumping stations now has a more reliable and accurate system for pump control.

Up, up, and away!

Seventy-eight pumping stations across Edmonton transfer wastewater from domestic and industrial sites to treatment facilities. The city's topography is quite flat, so these stations' large pumps lift wastewater and storm water from wet wells to the force main, which then carries liquids by gravity to be treated at the Gold Bar Wastewater Treatment Plant (WWTP).

One of Canada's largest WWTPs, Gold Bar treats more than 100,000 megaliters annually – or enough to fill an Olympic-size swimming pool more than 110 times each day!

Each of these pumping stations lifts wastewater anywhere from eight meters (26 feet) to 15 meters (50 feet) using variable frequency driven pumps, which are regulated by an ultrasonic level con-

With the numerous obstructions in this wet well, including a ladder, pipes, and chains, accurate and reliable level measurement can be quite challenging.

SITRANS LUT400 can be installed in a variety of mounting locations, including in panels, on DIN rails, pipes, or walls.

troller and PLC (Programmable Logic Controller). The level controller monitors water levels in the well, and provides level signals to the PLC, which in turn controls the pumps, turning them on and off when wastewater reaches the desired set points.

So, what's the problem?

One of Edmonton's wastewater pumping stations, #174, had difficulties with its existing level controller. Pumps were turning on and off randomly – and not at the desired set points. This malfunctioning could possibly result in flooding of the well or damage to equipment.

Most of Edmonton's wet wells are located near houses, businesses, and industry, so wastewater flooding could be a major problem – no one wants a city's wastewater in their basement! The cleanup required if a spill happened would be quite costly, repairing damage to buildings and property as well as dealing with the environmental impact.

Prevention of wastewater spillage into an environment is crucial for humans and other species living in these areas. Wastewater can contain deadly bacteria such as salmonella, viruses such as hepatitis A, and a number of other dangerous microbes. The intensive cleanup process after a wastewater spill includes restoring water quality by eliminating such bacteria and repopulating natural areas with both animal and plant species.

Costly damage to equipment is another potential problem with a malfunctioning level controller. If pumps continue to run past their off set point, they will run dry, which then can damage the motor and/or reduce the life of the pump. Flooding also can cause damage to both electrical and mechanical equipment in the pumping station, requiring costly repairs or replacement.

Finding a solution

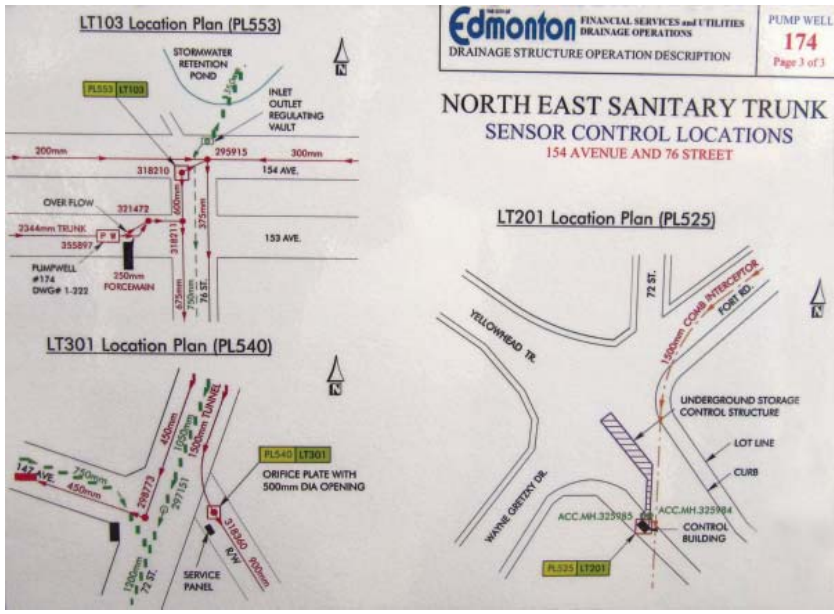
To investigate this level controller problem, Heng Khey, the City of Edmonton's Electrical and Instrumentation Coordinator, contacted Blaine Tokar, Senior Accounts Manager from Measurement and Control Ltd. (MCL), a Siemens channel partner.

These two visited the site and found that the level signals were being distorted due to electrical noise from the variable frequency drives (VFD) being induced on the transducer cabling. Instead of getting the clear material level signal from the transducer, the controller could pick up this electrical noise, which was causing the erratic behavior of the level controller. Level readings and the corresponding analog output to the PLC were not stable.

In addition to this noise problem, another limitation was the narrow construction of the wet well and the many obstructions in it. Because of these application challenges, operators could not install the ultrasonic transducer in an optimal location. The transducer's beam was therefore reflected off the obstructions, adding to the measurement difficulties.

Taking all of these factors into consideration, operators installed a SITRANS LUT400 ultrasonic level and pump controller. They easily connected it to an Echomax XPS-15 transducer, which they mounted in the wet well. Programming only took a few minutes, as the operator simply connected the controller to his laptop with a USB

SITRANS LUT400 is compatible with all Echomax transducers, so operators need not replace their existing transducers.



Since pumping station #174 is located in one of Edmonton's residential neighborhoods, accurate pump control is a must.

cable. He used the device's web browser software to configure the unit – no special programs needed!

As well, since Siemens Echomax transducers have a narrow beam angle, they are particularly suitable for this narrow well. Using SITRANS LUT400's auto false echo suppression feature, the false signals from obstructions were eliminated from the signal processing.

"Signal remains steady and strong"

Immediately after installation, operators noticed that the signal strength and signal-to-noise ratio improved dramatically. Under the same electrical noise conditions as before, the SITRANS LUT400 reported accurate level measurements and reliably controlled the pumps. These results have continued since the new system was commissioned, bringing a number of benefits to the City of Edmonton:

- Lower maintenance: Operators no longer need to check on the controller regularly, as the level readings and pump control are no longer erratic. With this increased confidence in pumping operations, operators can spend their time dealing with other maintenance requirements in the wastewater treatment system.
- Cost savings: The cost of troubleshooting the earlier controller has been eliminated, saving the City of Edmonton money year over year.
- Increased safety: By reducing the potential for wet well overflows, the new controller has enhanced the WWTP's safety. Operators now know the exact level of the well and can react quickly if necessary.

Heng Khey states, "This noise issue was a big concern for us, as the old controller's signal strength had deteriorated over the years. By installing the new SITRANS LUT400, the echo signal remains steady and strong, resolving the problem. It is working very well after installation."

As the City of Edmonton has seen, SITRANS LUT400 ultrasonic controller is a modern solution for this modern city's wastewater treatment system.

Siemens AG
Industry Sector
Sensors and Communications
76181 KARLSRUHE
GERMANY