VTScada and OpWorks Provide Advanced Wastewater Reporting and Analysis in Rapid City, SD

A Project by Dakota Pump, Inc.

By Natashia Lutz

Rapid City is the second-largest city in South Dakota, serving over 72,000 residents. Their Water Reclamation Department treats nearly 3.5 billion gallons of wastewater annually. This means their Water Reclamation Facility (WRF) processes approximately 10 million gallons of wastewater per day. Working with Dakota Pump, Inc. (DPI), the utility recently replaced their aging Honeywell PlantScape® DCS with VTScada software from Trihedral. In addition to providing state-of-the-art SCADA features like an integrated historian, trends, and version control, VTScada easily interfaces with OpWorks™, a web-based reporting suite that provides advanced reporting and data analysis from a variety of data sources including SCADA.

Why Upgrade to SCADA?

Quinten Shultz, Branch Manager for the DPI satellite office in Rapid City, explains the need to upgrade the PlantScape system. "The software was deployed in the early 2000's and was running on two Windows 98 computers. The software had not received an update in many years and was experiencing increasing, unexplained issues resulting in nuisance alarms, loss of communications, and loss of historical data. The firm responsible for the original software deployment had gone out of business and support for the system was scarce."

SCADA Software Selection Process

"During our investigation phase, DPI presented the city with three different software packages: VTScada, Wonderware, and FactoryTalk View. Each package was evaluated based on initial cost of software, hardware requirements, remote access capabilities, and recurring cost of ownership." Shultz explains that DPI recommended VTScada "because of its low initial cost, simple licensing and renewal process, sensible hardware requirements, unmatched access to technical support, and of course the ease of deployment."

Scalability and Redundancy

"DPI completed another project in 2012 for the city on their sewage lift stations using VTScada," continues Shultz. "As part of the WRF SCADA Improvements, it was decided to upgrade the existing Lift Station VTScada license to a Dual Server Premium package. This allows both the Lift Station and WRF SCADA Systems to operate redundantly at separate locations in the city." As the utility adds additional VTScada servers, they can be configured as additional levels of redundancy.
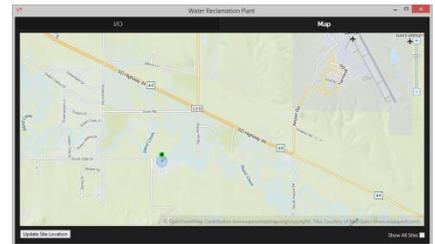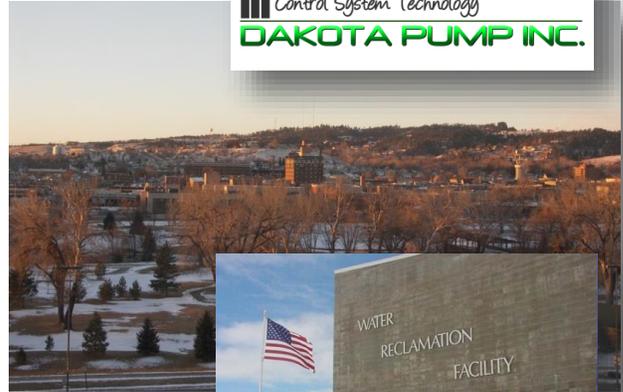
VTScada Slippy Maps Page
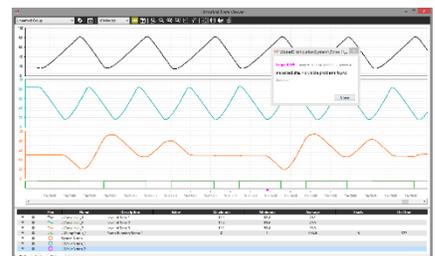
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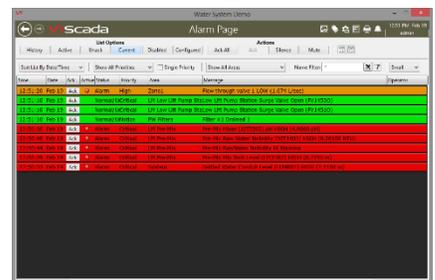
VTScada Alarm Page

The Conversion Process

Work started in February of 2015 and finished in August of 2015. Shultz describes some of the challenges involved, "In this case, keeping the system operational and not losing important data was always at the front of our minds when any change was made. The final system operates on two separate computers linked together over a private network. It serves both the water collection and water treatment operations, providing remote monitoring, alarming, and historical data collection and storage. Now Rapid City has remote access via mobile devices, convenient reporting, and offsite redundancy, just to name a few features that they did not have before."

System data tags were exported from each PLC and entered into VTScada prior to building the graphics. "A big time saver with VTScada is that once a tag is entered, it can be used in so many different ways. There is no need to configure separate data logging models or alarm rosters," says Shultz. "Using mobile devices (tablets, phones, etc.), DPI programmers worked with the operations staff and facilities electrician to verify each data point from its input source all the way through the VTScada alarming and historian system, says Shultz. "During this process, data points were discovered that had not been working for some time." To maintain a familiar look and feel, DPI's programmers used screenshots of the existing HMI screens as guides to build new screens in VTScada.

In addition to developing and deploying the new VTScada application, DPI replaced an existing CISCO AiroNet wireless system with 8,000 feet of single mode fiber optic cable installed in a self-healing ring with SixNet managed media converters featuring Rapid Spanning Tree Protocol (RSTP). This new network provides Ethernet connectivity to 13 existing PLC's plus other peripherals such as HMI's, VFD's, Power Meters, etc. Finally, DPI connected VTScada to an internet-based data management application called OpWorks.
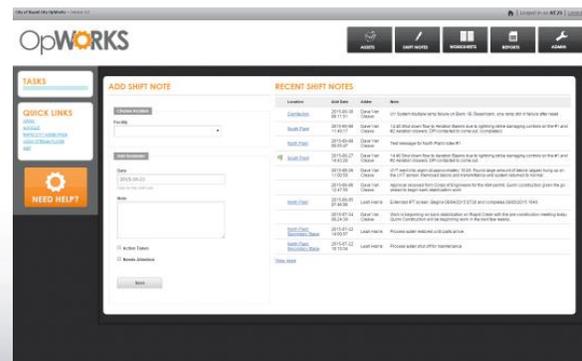
Integrating VTScada and OpWorks

OpWorks is a customizable, web-based solution for operators and managers that eliminates paper logs, creates a single database interface for easy information retrieval and reporting, and assists with better management and operational functions. According to Andrew Ring, Controls Technician at DPI, "it was quite simple to start sharing the SCADA data. After we received the credentials from OpWorks to access the database, we used [VTScada's] SQL Server logger tag."

Though VTScada has a built-in suite of SCADA reporting and historical data trending tools, OpWorks incorporates data from a wide variety of data sources. According to Jason Sanden of OpWorks, "The previous reporting system [at Rapid City] was quite cumbersome and took several steps for staff members to complete daily reports. Now with VTScada logging key process data to the OpWorks database and the operators entering data through OpWorks worksheets, the reports are instantly available over the internet. OpWorks can even collect data from the USGS creek monitoring station that the staff need for reporting. OpWorks has a trending chart component that the operators are using. Several custom trends that combine VTScada data and manually entered data have been created to analyze different processes."
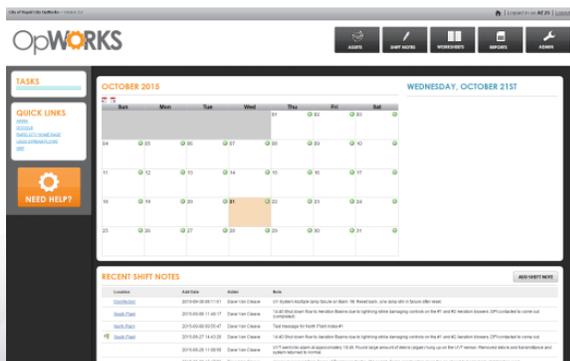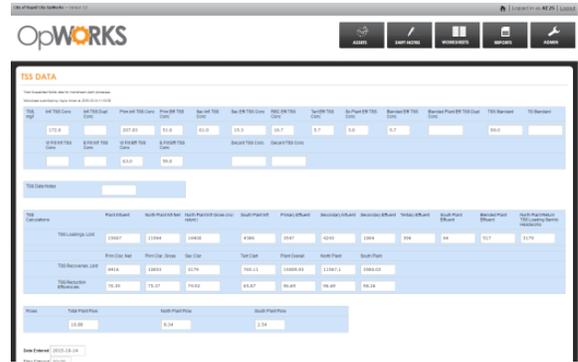

| Rapid City's OpWorks Dashboard | OpWorks Shift Notes |
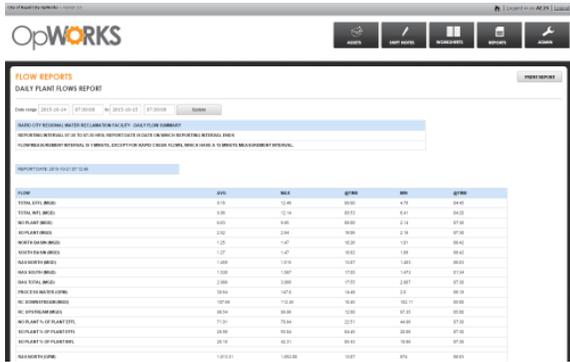
OpWorks Report Page

OpWorks Completed Worksheet

Plans for the Future

"On this project DPI was able offer a turnkey package, functioning as Consultant, SCADA Integrator, and Prime Contractor," says Shultz. "This dynamic really made for an enjoyable experience. Probably the best thing to come out of the project was the opportunity we had to get to know the people/staff from the City of Rapid City, a top notch group of individuals and a pleasure to do work for. We look forward to working with the Rapid City for years to come."

"DPI plans to continue to grow our business and we see Trihedral as being a key component in our success, says Shultz. "As many SCADA software packages continue to offer less value and higher cost, we are excited to offer VTScada to our clients. We are finding that VTScada sells itself, even on projects that specified different competing software products."

He continues, "VTScada helps us to increase efficiency by its overall ease of use. Access to real live technical support is also a major factor. Other software vendors charge hefty amounts and offer little in the way of practical help. Trihedral has set a higher standard."

About Dakota Pump, Inc.

Since the 1950's Dakota Pump, Inc. has manufactured high quality pumping systems for water and wastewater utilities. An integral part of that manufacturing and engineering business has been an in-house UL508A panel shop. The custom control business has evolved greatly since the days of electro-mechanical control. Today, programmable controls are at the heart of nearly every product built at DPI. In the late 1990's the movement to programmable systems in the OEM pumping business was just gaining momentum.

By 2002, DPI found that outsourcing programming services for these products was no longer cost effective, so in 2003, DPI started an Automation and Control Group. Since forming the Automation and Control Group, DPI has become recognized in South Dakota (and parts of adjoining states) for building non-proprietary, and serviceable SCADA systems of the highest quality in addition to systems built for OEM pumping systems. DPI offers automation services from initial concept to engineering to final commissioning.

Markets served include treatment of water and wastewater, irrigation, machine building, and industrial coating systems. Regardless of the industry, customer service is the main focus at Dakota Pump, Inc.

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