Aqua+ Increases Plant Control System Design Speed by 50 Percent with Promis.e

Utility Firm Delivers Water Treatment Plant Project Documentation Two Months Ahead of Schedule and with 70 Percent Greater Quality

Project Summary

Organization
LLC Aqua+

Solution
Water and Wastewater

Location
Khabarovsk, Far East Federal District, Russia

Project Objectives

- Commission the RUB 10 billion Tunguska Groundwater Intake Facilities to replace existing surface water supply from the Amur River.
- Integrate intraformational water treatment technology to reduce processing costs by 2.5 times less than conventional methods.
- Create a complex industrial control system for automatic water quality monitoring and control.

Products used
Promis.e

Fast Facts

- Aqua+ integrated the facilities' automated system with the utility's water management system, providing a single, enterprise-wide control system.
- Promis.e automated the workflow for production of more than 6,000 pages of documentation.

ROI

- Bentley's electrical design software increased design speed by 50 percent and improved documentation quality by 70 percent.
- Drawing input from custom Excel tables, the PLC generator produced programmable logic controller (PLC) schematics in 40 percent less time than conventional methods.
- Cabinet specification and labeling took 30 percent less time using Promis.e.

Underground Water Treatment Leader

Khabarovsk Municipal Unitary Enterprise "Vodocanal" (Khabarovsk Vodocanal) provides water supply and sewerage facilities for the city of Khabarovsk in Russia's Far East Federal District. As part of a program to shift from surface to underground water sources, Khabarovsk Vodocanal constructed the RUB 10 billion Tunguska Groundwater Intake Facilities to deliver 106,000 cubic meters per day (m3/d) of water to the city of Khabarovsk. Aqua+ performed design, construction, installation, and commissioning of the intake facility's automated water quality monitoring and control system, which reduced facility staffing requirements tenfold. Promis.e, Bentley's electrical system design software, allowed Aqua+ to complete the design work quickly and accurately deliver approximately 6,000 pages of high-quality project documentation in just 10 months – two months sooner than planned.

Automating Quality Control

As one of the largest water and sewer service providers in the Far East, Khabarovsk Vodocanal has more than 1,200 kilometers of municipal networks, 47 water and 33 sewer pump stations, and the capacity to treat 374,000 m3/d of potable water and 220,000 m3/d of wastewater. Khabarovsk Vodocanal's shift to underground water sources can be attributed, in part, to the utility's early adoption of intraformational water treatment technology, where groundwater is treated within the geologic formation. This innovative treatment process costs 2.5 times less than conventional treatment methods, requires less infrastructure than surface water treatment, uses no chemical reagents and requires no solid waste disposal.

The Tunguska Groundwater Intake Facilities are one of the most noteworthy projects of the past decade and comprise 12 wells, five sections for water treatment, and two pumping stations. Construction of the intake facilities began in 2006, and the first phase was commissioned in 2012 with a capacity of 25,000 m3/d. As part of the second phase of the project, completed in 2015, Khabarovsk Vodocanal implemented advanced monitoring and control technology to automate operation of the intake facilities, reduce staffing requirements, and eliminate human error. Challenges during design of this complex system included the purposeful selection, connection, and programming of precision instrumentation for reliable supervisory control and data acquisition (SCADA).

Promis.e Streamlines Collaboration

Khabarovsk Vodocanal retained Aqua+ to design, construct, install, and commission the works for the automated water quality monitoring and control system at the Tunguska Groundwater Intake Facilities. The Moscow-based specialist in SCADA for water supply was uniquely qualified to design a system capable of providing direct control of the groundwater wells and treatment process. Moreover, Aqua+ was charged with integrating the local automation facilities with Khabarovsk Vodocanal's existing water utility management system to provide a single, automated enterprise management system for the city of Khabarovsk.

Aqua+ selected Promis.e to provide a collaborative design environment for the project team. Development of the industrial-grade control system (ICS) required Aqua+ to generate more than 6,000 diagrams, drawings, and reports. Promis.e streamlined the workflow among the various specialists, who were able to simultaneously work on different types of documents. The software's intelligent design capabilities allowed the transfer of product information from one document to another, ensuring the accuracy of project data.

The automated water quality control system has proved to be extremely reliable and accurate, ensuring minimum operating costs and quality water for the city of Khabarovsk.

"Bentley technology was a reliable tool in our hands, helping us to raise and improve the level and quality of our projects, making them the benchmark in the segment of automation of water and sanitation."

– Aleksey Anatolievich Dorozhkin, General Director, Aqua+

Find out about Bentley at: www.bentley.com

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Bentley's Promis.e enabled Aqua+ to store all project information in a connected data environment, giving professionals access to the most current version of documentation, whether they were working locally or remotely. The software's deeply integrated electrical design process facilitated the selection and positioning of the most reliable and accurate equipment. The process ensured constructive and purposeful use of space – from placing equipment in the large pumping stations to locating terminals and devices in control cabinets.

Generating Quality Documentation

Aqua+ used Promis.e to produce 29 volumes of project and design documentation, with each volume comprising 220 pages of diagrams, drawings, and reports. Promis.e provided significant time savings in several areas, allowing the project team to complete the design work quickly and accurately. In about half the usual time, Promis.e automatically generated some 2,000 documents specifying equipment, cables, connections, and other items. Using the flexibility of Bentley's electrical system design software, Aqua+ also developed a fully open API to input data from Excel tables into the PLC generator, enabling the software to produce programmable logic controller (PLC) schematics in 40 percent less time than conventional methods. Cabinet specification and labeling took 30 percent less time using Promis.e, while the navigator function simplified item placement.

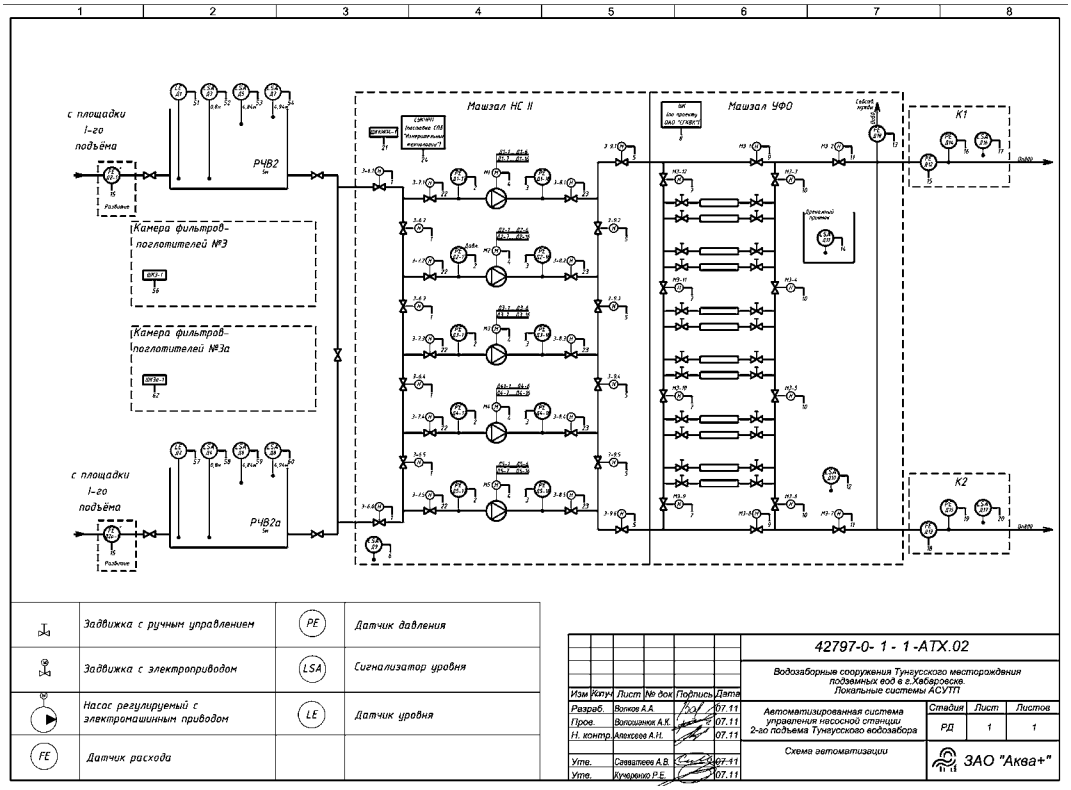
Bentley technology allowed Aqua+ specialists to concentrate on core tasks without being distracted by routine operations. Automated functionality such as built in error-checking helped avoid more than 30 types of mistakes, elevating the design quality. The localization module ensured design documentation was in full compliance with local standards. By preventing the divergence of project and design documentation, Promis.e contributed to significant savings during assembly and installation.

50 Percent Increase in Design Speed

Bentley's collaborative, interoperable applications streamlined workflows, enabling Aqua+ to issue project documentation for the automation of the water intake facilities in just 10 months. Using Promis.e increased project design speed by 50 percent and improved documentation quality by 70 percent. The minimization of errors and quick correction of inaccuracies significantly reduced the time spent on installation and commissioning of the SCADA system, which contributed to overall project cost savings.

The automated water quality monitoring and control system proved to be extremely reliable and accurate, helping to minimize facility operating costs and deliver better water for the city of Khabarovsk. The project team's attention to details, such as proper specification of equipment for sample selection and preparation, helped to ensure Khabarovsk Vodocanal achieved its water quality goals – all while reducing the facilities' staffing requirements tenfold.

Khabarovsk Vodocanal plans to repurpose the unique engineering of the Tunguska Groundwater Intake Facilities for use at underground water treatment facilities in other areas, ensuring the benefits of advanced technology and engineering are realized throughout the region.



Aqua+ used Promis.e to generate over 6,000 project documents quickly and accurately, which significantly reduced the time spent on installation and commissioning and contributed to overall project cost savings.