The software enabled Prolagos to identify the system’s bottlenecks and thus design an alternative expansion plan that would save US$4.5 million (BRL 17 million) in annual energy costs.

WaterGEMS generated more than 50 simulated hydraulic modeling scenarios of the entire supply and distribution system. The software enabled Prolagos to identify the system’s bottlenecks and thus design an alternative expansion plan that would save US$4.5 million (BRL 17 million) in annual energy costs. The new plan would reduce energy consumption by 59 percent, thereby reducing energy costs from 1.09 kilowatt hours per cubic meter (kwh/m³) to 0.65 kwh/m³.

Specifically, the WaterGEMS hydraulic modeling helped highlight the interventions necessary to reduce high-pressure losses, taking into account that some intake stretches currently experience head losses greater than 15 meters (m). The new intake scenario allowed Prolagos to reduce losses to 5 meters by turning off two of the four greater capacity boosters of the system, which accounts for 78 percent of the power consumed by the network. With the calibrated hydraulic modeling, Prolagos could select the best alternative strategy based on the most effective combination of capital investments, operational expenditures, and projected energy costs from increased water supply in high-population areas and during high season.

Innovation in Water Treatment Plants Award

The Russian engineering consultancy ConsultProm was awarded for its innovative use of Bentley's prom•e control system design software to develop an integrated remote monitoring control system for the US$142 million Tunguska groundwater water intake facilities located in the city of Khabarovsk, Russia. The project will provide clean water to Khabarovsk, the capital of the Russia's Far Eastern Federal District. It is also one of the most significant infrastructure projects in Russia in terms of ecological conservation, environmental protection, and technology innovation.

Aqua+ performed design, construction, installation, and commissioning works for local automation facilities and integrated the works with the existing management system. Using Bentley's prom•e software for all project and design documentation, Aqua+ was able to automatically generate 2,000 accounting documents in half of the usual time. Consequently, the company was able to issue the total documentation of 6,000 pages in 10 months, two months faster than originally scheduled.

Most importantly, the project will enable the city of Khabarovsk to intake 125,000 cubic meters per day (m³/d) of groundwater instead of the unreliable Amur River as its source of drinking water. In terms of water quality, the Amur has been plagued with ongoing contamination issues, and it also experiences high water and floods, creating instability in the city’s water supply.

Construction of the water intake began in 2006. In 2012, the first assembly began operations with a capacity of 25,000 m³/d. In April 2013, Russian Prime Minister Dmitry Medvedev visited the Tunguska intake and took part in the commissioning ceremony of the second section of the diversion facilities, which will provide sufficiently clean drinking water to approximately 300,000 people. Upon completion, the Tunguska water intake will provide water to service the city’s population of 607,000.

The chemistry-, freeboard-, and groundwater treatment process offers significant advantages in costs and water quality. Water from the groundwater wells is chlorinated with oxygen to remove manganese, disinfected with ultraviolet light, and then further treated with water treatment plants. Aqua+ estimates the underground treatment costs for one cubic meter of water to be less than conventional methods.

The author, World Water Editor Pamela Wolfe, participated as a juror in Bentley's Infrastructure Be Inspired Awards program.