DOROT

Aquestia
Directing the Flow

Case Study

Chaco Province, Argentina

The largest hydraulically flow-modulated pressure-reducing valve in the world.

Background

The Paraná River is the second longest river in South America, passing through Argentina before it flows into the South Atlantic Sea. In the north east of Argentina, a 512 km long aqueduct - the second aqueduct for the interior - is being developed, supplying water to 26 demand-zones. It currently serves 420,000 customers, with an expected increase to 680,000 customers by 2045.

The intake, pumping station and water treatment plant for the aqueduct works are located in the city of Resistencia, Chaco Province, on the Paraná River.

Challenges Finding the sweet spot for optimal flow

Variations of up to nine meters exist between the highest and lowest levels of the river, which impacts on the performance of the aqueduct pumps. While the pumps do have a speed variator, the minimum operating flow rate could not be reached.

SAMEEP, the provincial state water service and maintenance company responsible for the aqueduct, turned to Aquestia's local distributor, Valvtronic for a solution that would keep the pumps working continuously at the optimal level. Two requirements were specified: accuracy and stability of the calibration value; and reaction speed for correction of flow deviations due to an increase/ decrease in demand.

Solution A fine-tuned system

The hydraulic solution proposed by Aquestia was a Pressure-Sustaining Dorot valve, installed on a T-junction, to divert part of the flow back to the river in certain pumping conditions, ensuring that the pumps always operate at the required point of the characteristics-curve.

At certain times, very low inlet-pressure exists. To assure full opening, the valve was installed in an inverted position ('over the seat'). The main pilot, which is responsible for the fine calibration, has a large-area diaphragm for increased sensitivity and accuracy of the calibration, and enables detection of pressure differentials of +/- 0.2 MWC.

An auxiliary pilot valve was provided for accelerated closure in the event of a rapid pressure drop (due to a sudden increase in consumption), and accelerated opening in the event of a rapid increase in pressure, to release water.
Thanks to this unique control system, the objective of achieving the optimal flow requirements, regardless of pressure deviations, was achieved.

Technical specs.

Model: S300 DN400/16"
Set pressure: 7.8 m
Flow to be diverted: 800-1400 m3/h
Discharge pressure: Atmospheric