ConDor

Aquestia
Directing the Flow

Case Study

Tirat Zvi Mixing Junction

Smart It Up - turning an existing third-party hydraulic valve into a smart water system

Background

Tirat Zvi, a kibbutz that sits just west of the Jordan River, is the largest date-palm grower in Israel, with 18,000 trees. The water used to irrigate these trees and other crops grown on the kibbutz come from two sources: a potable water line, the 'sweet line', supplied by Israel's national water company, Mekorot, at a high cost and a kibbutz-owned well that pumps saline water from the aquifer. As a result, the customer was required to mix expensive potable water with less expensive, high salinity water, in order to obtain an optimal balance between water quality and cost while maximizing crops quality and saving water.

Challenge

Creating optimal salinity and balancing pressure

To achieve an optimal balance between water quality and cost, while also maximizing crop quality and saving water, Tirat Zvi mixes the expensive potable water with the less expensive, but highly-saline, water from the well. This takes place at a mixing junction on the kibbutz's water irrigation supply line. However, the existing third-party hydraulic valve was not optimizing salinity levels. What's more, since the pressure level varies between the two branches which feed in water from Mekorot and from the well respectively, an additional challenge arose regarding how to achieve higher pressure levels in the well branch.
The kibbutz looked to Aquestia to provide a smart solution, to be installed on the existing water infrastructure, that would ensure the optimal salinity level and balance the pressure of the two branches.

Fig. 1

Solution

A true Smart It Up installation

Following an assessment of Tirat Zvi's existing system, Aquestia Smart It Up application engineer and field technician designed the following solution: first step was to turn the existing hydraulic valve into an electrically-controlled valve, by installing the ConDor controller (Fig. 1) on the well water source (which was kept at a higher pressure). This controls the output of the mixing junction and maintains an optimal level of electric conductivity. To accommodate the ConDor command, the existing control trim was replaced with a simple, two-solenoid control trim (Fig. 2).

To maintain higher pressure on the saline water line source, a Differential Pressure Sustaining system (Fig. 3) was installed on the potable water line from Mekorot. This keeps a constant pressure differential between the sweet water line and the well (saline) water line, guaranteeing optimal functionality of the mixing junction function, and ensuring that the irrigation water is at the permitted salinity level.

Due to the versatility and flexibility offered by the ConDor installation, Aquestia technicians were able to respond to an on-the-spot request by the customer to connect the existing flow-meter input into the ConDor, so that the data flow could be read, logged, and transferred from the field installation to the water operator monitor and control platform. In addition, the installation had to maintain the valve position in case the irrigation stops. The function was configured on-the-spot, to set the valve in 'keep position' in the event that water flow drops below a certain value.

Fig. 2

Fig. 3

Following the successful installation and initial training, the customer added additional sensors to the mixing junction as inputs into the ConDor, enabling 24/7 logging, accessible via their mobile phone.

Results

Mission accomplished

Thanks to the proper regulating of the two water sources that the Aquestia Smart Water Solution controls, Tirat Zvi is now assured of the correct level of water salinity for the crops being irrigated, while maximizing cost efficiency. At the same time, the smart system controls real-time, on-site, field communication via mobile phones and the cloud, further streamlining the kibbutz's date-palm growing operations to make them more efficient.

" I am very pleased with the installation. Aquestia personnel took care of everything, including connecting the sensors and the ConDor controller, along with its configuration. As the installation was underway, I decided on the spot to add our existing flow meter input into the ConDor. The Aquestia team were happy to accommodate this late request. Thanks to them, it all went very smoothly. "

Kibbutz Tirat Zvi representative, Agriculture Water Infrastructure