



Case Study

Turning Hydraulic Complexity into Reliable Flow - Safeguarding Irrigation in Water-Scarce Conditions

Background

When declining water levels made existing pumping impossible, a drought-stricken agricultural region in northern Israel faced an urgent need for a new water supply solution. To secure continued irrigation for local agriculture (mainly orchards) a backup project was launched, including a reservoir, pumping station, and transmission pipeline, distributing supply across multiple sources to ensure reliable, continuous water delivery.

Challenges Ensuring pressure stability

The main engineering challenge involved protecting the pumping and pipeline system from water hammer and other extreme pressure events. This required preventing both positive and negative pressure surges caused by sudden shutdowns of the pumping units, while ensuring pressure stability to avoid damage to equipment and surrounding infrastructure in the event of an uncontrolled pump stoppage. Meeting these demands called for a deep understanding of the site topology, operational needs, and system constraints, along with high-level hydraulic expertise and advanced analytical tools to characterize each system and ensure smooth and efficient operation.

Solution From hydraulic analysis to tailored product selection to field implementation

The project's engineering firm partnered with Aquestia to deliver a comprehensive hydraulic solution for the pumping and transmission system. Using our advanced software and expert analysis, we performed full hydraulic characterization, detailed surge analysis, and tailored product selection.

A computer model we built based on the system's design data simulated a maximum flow rate of 900 m³/h and sudden pump shutdowns. This revealed the need for appropriate protection to avoid severe pressure risks, in the form of optimally placed air valves to prevent vacuum conditions and surge anticipating valves to absorb pressure peaks.

Accordingly, the system was equipped with:

- A.R.I. D-050 Air valves at the pump station and along the pipeline
- DOROT S300 RE Surge Anticipating valves
- DOROT S300 PR Pressure Reducing hydraulic control valves
- DOROT S300 QR Quick Release hydraulic control valves
- A.R.I. NR -040 FS Non-return valve



Results Maximum performance with minimal installation

Aquestia's technical expertise and customized solution design now provide farmers in this challenging region with precise pressure management, effective air release, and reliable surge control, delivering a complete, efficient, and safe hydraulic solution that ensures continuous irrigation.