CASE STUDY

PROJECT: Wolkaiyt Project – Ethiopia

Use of DOROT applications: 30BC, 30-RE, 30-PS[R] and DAV-M Air Valves

Premises

The project comprises of establishing a large infrastructure of a water-supply, from a dam on the Zareima river to one of the largest sugar-cane irrigation and sugar-production schemes. When it reaches its maximum production capacity, a production of 484,000 tons of sugar and 41,654-meter cube ethanol a year will be reached. The project's total area of land for sugarcane cultivation is 50,000 hectares. The system is supplied by Netafim and designed by BARAN group in Israel.

The system includes:

- The construction of two pumping stations which draws water from the river and discharge it onto 4 reservoirs of total 250K cubic meters. The two pumping stations includes a total of 14 (8+6) vertical pumps for a total flow of 22000 m^3h.
- Additional 6 pumping stations includes 30 vertical pumps, pumping water from the reservoirs to the irrigated area through 600mm-1500mm GRP pipes. The total length of the mainlines is about 60km.

* http://ethiopiansugar.com/index.php/en/projects/wolkayit-sugar-development-project

Dorot is proud to be the main supplier of hydraulic control solution to the Wolkaiyt project that will supply direct and indirect jobs to some 600,000 citizens in Ethiopia.*

The Challenge

DOROT was required to provide hydraulic control and protection devices, for the pumping stations and the pipelines in the project. The protection required to attenuate and prevent cases of water-hammer and to prevent damage to the pipe-system due to risky sub-atmospheric pressures. In addition to the above, it was required to enable efficient operation by discharging accumulated air in the piping system.

The system was analyzed, using high-end computerized surge-analysis and vaccum\air-valve design tools. The suggested solutions, have been designed based on the analysis results and include various sized of:

- Pump control valves,
- Surge anticipating valves,
- Pressure sustain\relief valves,
- Vacuum\Air valves

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The Solution

DOROT Pump Control Valves, Model 30-BC where installed on each pump discharge. The 'BC' valve will minimize pump starting and stopping surges by slowly opening at pump startup and slowly closing prior to pump shutdown.

DOROT Surge Anticipating Valves, Model 30-RE where assembled on a T-junction to the pump discharge header. These valves attenuate and relief water-hammer caused by sudden pump shutdown (as a result of power failure). The valve instantly opens when the pump stops, relieving the returning high pressure-surge. The valve slowly close once the pressure returns to the static level. The valve also functions as a pressure sustaining\relief valve.

DOROT Pressure Sustaining\Relief Valves regulates the system's pressure when the demand is low. The valve maintains a steady, predetermined pressure in the system by relieving access pressure back to the pump intake.

DOROT combination Vacuum\Air-Valves, model DAV-M-KA, where installed along the mainlines and at the pump-stations. The air valves allow the discharge of accumulated air from a filling or already pressurized pipeline and prevent pipe-collapse and cavitation risks due to sub-atmospheric pressure conditions that may occur when the pipeline is being drained, by allowing intake of atmospheric air into the system. Some of these air-valves are fitted with a surge-arresting device ('SA') that limits the rate of air discharge during the system-filling stage, thus assist in creating an 'air cushion' that prevents float-slamming and water-hammer.

Results:

The Project is under construction and is expected to be commissioned at the second half of 2019.

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