

Multi-Tasking Level Control: Cla-Val's Modulating Level Control Valve with Flow Metering provides the Virginia town of Front Royal with an all-in-one solution for their water treatment plant expansion

- **Single valve controls flow & performs metering**
- **Alleviates the need for separate metering devices**
- **Helps meet regulatory requirements**
- **Interfaces with plant's control system**
- **Maintains a constant level in tanks & reservoirs**
- **Takes less space than other options**

Cla-Val recently had the opportunity to demonstrate our application ingenuity and advanced electronics capabilities in a project that will more than double production at Front Royal's water treatment plant - going from 3 million gallons of water per day to 6.5 million gallons per day. The plant has been in operation since 1960 with very few modifications until the expansion project began in 2006.

The water supplying the town and neighboring communities is drawn from the Shenandoah River, piped more than three miles to the Front Royal Water Treatment Plant (WTP), and then pumped up an incline of approximately 300 feet into a raw water reservoir. From the reservoir, the water feeds by gravity into the plant through two 400,000-gallon pre-treatment settling basins. (See page two for a system diagram)

For the expansion, engineering consultant, R. Stuart Royer Associates was tasked with designing a system that incorporated metering capabilities to ensure that the outtake from the river did not exceed government regulations as enforced by the Virginia State Health Department. The designers also needed to find a way to control flow into the plant by maintaining a rate equal to effluent potable water demand. One possible alternative was to use an actuated butterfly valve with a separate venturi flow meter or mag-meter. The designers rejected this idea in favor of seeking a simpler, streamlined solution that could incorporate several functions into one product.

They contacted Cla-Val's Eastern Region Sales Office to learn the feasibility of combining multiple functions into a single valve control system to handle both the level control and flow monitoring requirements. The application was further complicated by the fact that there was only seven feet of elevation difference between the raw water reservoir and the settling basins into which it fed, making for a very low pressure differential.

The Cla-Val representative recommended using our 24-inch Model 631-02 Electronic Modulating Level Control Valve with passive flow monitoring to meet the Health Department regulations and the WTP's operational requirements. The valve utilizes two controllers:

- Model 131VC-1 to control valve position depending on downstream basin elevation and
- Model 131VC-3T to monitor valve position and differential pressure as well as metering the flow

Due to the application's pressure differential pressure of only 2.4 psi, the Cla-Val representative recommended utilizing the dual chambered Powertrol valve with an auxiliary pressure source of 50 psi that was available at the plant. The 131VC-1 monitors basin level and valve position with an X117D Position Transmitter. This positions the 24-inch main valve proportionally to maintain a water level 9.62 feet in the two pre-treatment basins. If the level drops when operators filter more water through the plant, the Cla-Val 24-inch valve opens to maintain the prescribed water level in the basin. If the level rises as the filtered effluent is decreased, the valve closes to maintain the appropriate level. The 131VC-1 accomplishes this through pulsing solenoids set to send water pressure to the valve cover and intermediate chamber. This, in turn, opens or closes the main valve to maintain a steady level in the settling basins. The valve position signal is retransmitted from the 131VC-1 to the 131VC-3T Controller. It utilizes this signal along with the differential pressure signal to meter the flow through the main valve. The 131VC-3T Controller then retransmits the 4-20mA signal through the treatment plant's PLC for reporting purposes.

This multi-tasking valve control system serves three roles at the Front Royal WTP:

- (1) It monitors and maintains a constant level in the basins
- (2) It controls flow through the plant
- (3) It meters raw water effluent flow and sends the signal back to the plant PLC to meet plant requirements for Health Department data

Aside from the obvious benefit of being able to utilize one valve to perform multiple functions, other advantages made the choice easy for the specifying engineer, including:

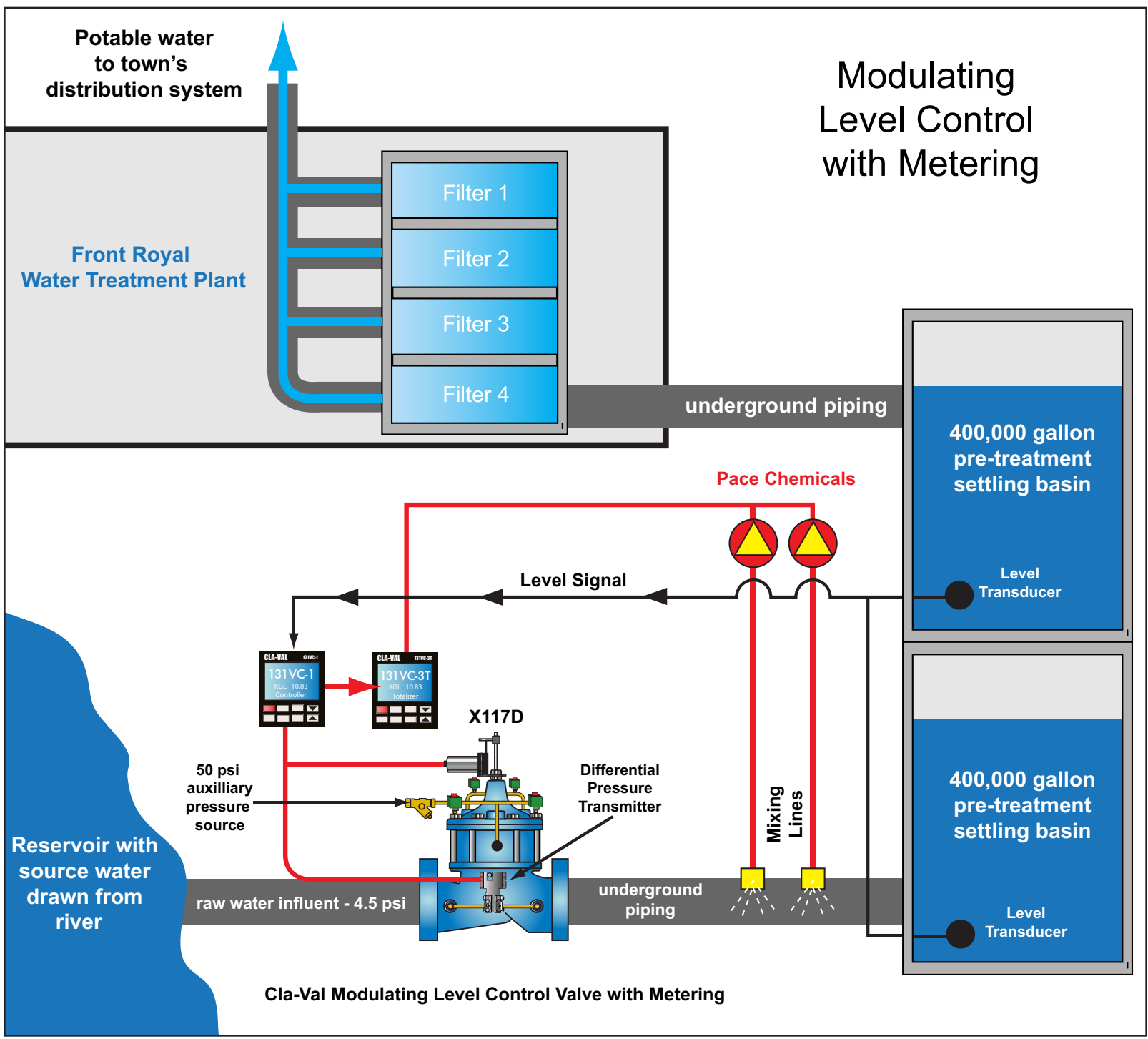
- Our valve uses hydraulics to control valve position and requires only routine maintenance versus the actuated butterfly valve/ external meter option discussed above which uses an actuator to control position and requires more frequent surveillance.
- The valve Cla-Val supplied for this project performs metering without the use of an external device thus eliminating the need for 5 pipe diameters upstream and 10 downstream of the meter, making our solution a space-saver in terms of linear piping.

Most important is that the Cla-Val solution is clearly the most technologically advanced of available options and is scalable because other functions can be added if plant requirements change. The crowning touch in this story, however, is that Cla-Val's electronic valve lives up to Front Royal's official town credo "Blending the best of the future with the best of the past".



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 visit www.cla-val.com to see our entire product offering.

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