

Control Valve Solution Improves Reliability and Uptime in Abrasive Applications

KEY RESULTS

- > Valve service life was increased 600%, eliminating shutdowns, and improving uptime & profitability.
- > Technical solution reduced impact of erosive media.
- > Improved flow, controllability, and rangeability.
- > Estimated savings of \$34,630 per valve over 2 seasons.

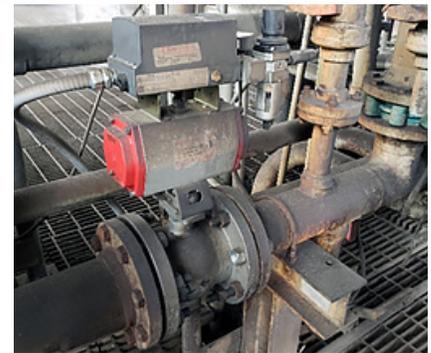


APPLICATION

Optimized control valve and automation package for decanter mud feed at one of the largest sugar refiners in the United States.

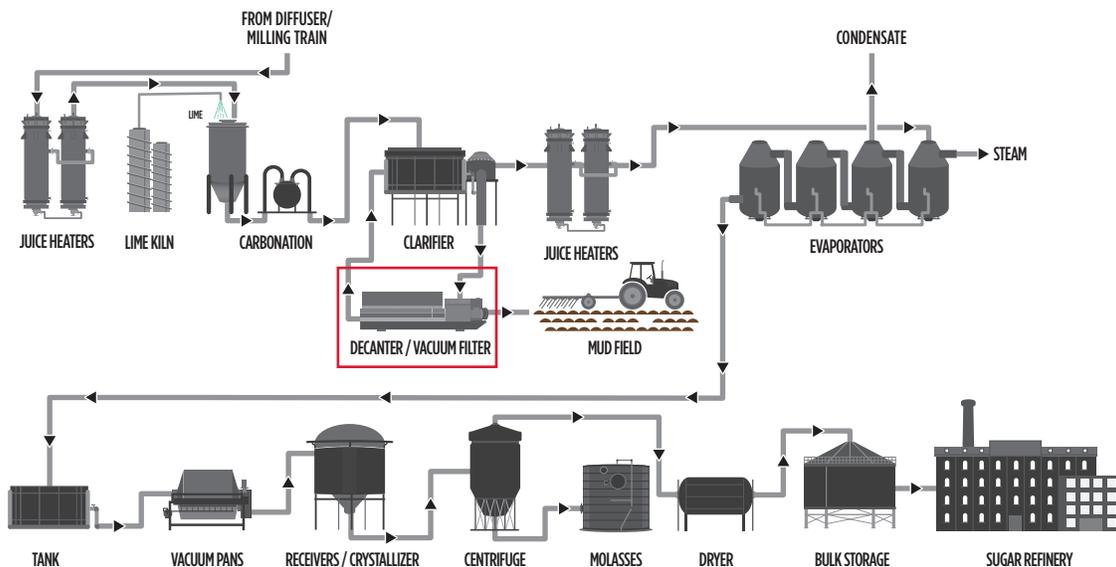
The nature of the sugar production & refining industry requires uninterrupted service of the plant, for up to 300 days in a year. The demanding process puts valves, actuators, and controls through harsh conditions. Continuous service and uptime are critical to profitability of the sugar plants — making it essential that the valves and actuators supplied are capable of withstanding the tough conditions.

During operation, decanters are used to process the clarifier mud underflow, and further extract juice from the sugar mud — which is highly abrasive, containing fiber, sand, rocks and minerals. The decanters are often used with rotary vacuum filters to supplement the overall filtration capacity of the sugar plant — making them a critical part of the sugar production process.



Bray supplied an optimized control valve and automation package, including an S19L segmented ball valve, S93 rack and pinion actuator, and S6A positioner w/diagnostics.

TYPICAL SUGAR PROCESSING APPLICATION



CHALLENGE

Sugar mud flow to the decanter is regulated by a control valve, based on process requirements. However, a competitor's control valve was leaking severely, resulting in critical loss of product. Poor control of mud feed to the decanter led to inconsistent flow rates — causing the decanter to go offline multiple times during the season. The valve was being replaced every 3 to 4 months, requiring costly shutdowns and loss of production.

SOLUTION

Bray's investigation revealed the leakage was caused by severe erosion from the abrasive media. The Bray Technology Group researched a solution, using Computational Fluid Dynamics (CFD) to simulate the flow of the failed valves.

After analysis, Bray recommended the Flow-Tek Series 19L Segmented Ball Control Valve, with several modifications to enhance the lifespan of the valve.

- > Characterize the ball segment for improved flow, precise control, and better rangeability.
- > Reverse the flow direction, to minimize erosion on the valve wall and face of the ball segment.
- > Install a field-replaceable liner downstream, to increase abrasion resistance.
- > Add proprietary surface coatings to ball segment and body bore, for additional abrasion resistance.
- > Include advanced diagnostics in controls package to allow continuous monitoring of valve performance.

RESULTS

The proposed valve was installed as recommended, with reversed flow direction. After periodic inspections, the valve has shown **no signs of erosion** on the ball segment, seat, body walls, or liner. The segmented ball control valve has performed continuously for 2 full sugar seasons with **no leaks** and **no decanter downtime**.

The Flow-Tek S19L valve:

- > **Eliminated leaks**, resulting in recovery of lost product.
- > **Improved control and rangeability**, resulting in consistent decanter uptime.
- > **Eliminated costly shutdowns** for frequent valve replacement.
- > Has an **expected service life** of 3 full sugar seasons, or **900 days**.

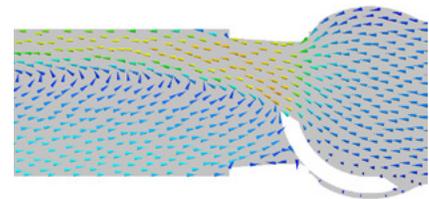
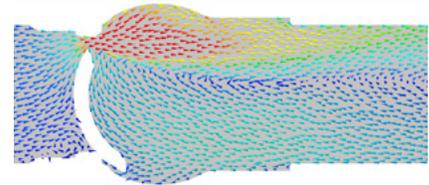
ESTIMATED TOTAL SAVINGS PER VALVE

TOTAL COST OF OWNERSHIP	COMPETITOR	BRAY
Annual removal cost (twice per season)	\$180 (2 x \$90)	—
Annual installation costs (twice per season)	\$180 (2 x \$90)	\$90 (one time)
Annual replacement cost (twice per season)	\$17,000 (2 x \$8500)	—
Total Maintenance Costs for 1 Season	\$17,360	\$90
Estimated Total Savings for 2 Seasons		\$34,630

Note:

Overall savings does not include values for operating expenses and reclaimed production.

Bray takes pride in their unique ability to rapidly deploy resources — delivering customized solutions for our customers' toughest applications. To learn more about our full line of flow control solutions, visit BRAY.com



CFD analysis simulates the flow of the failed valves (top) and proposed solutions (bottom).



Inspection revealed remnants of the harsh media, but the valve showed no signs of erosion on the ball segment, seat, body walls, or liner.