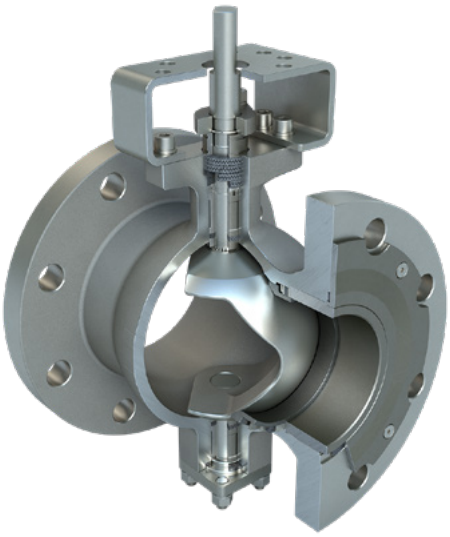
Control Valve Solution Improves Service Life in Refinery Slurry Application

KEY RESULTS

- Technical solutions mitigated impact of slurry erosion.
- Extended useful valve service life significantly.
- Eliminated costly shutdowns required to replace failing control valves.
- Bray S19L solution became customer's new standard specification for FCC slurry control applications.
- Estimated savings of $426,545 per valve, over 5 years.



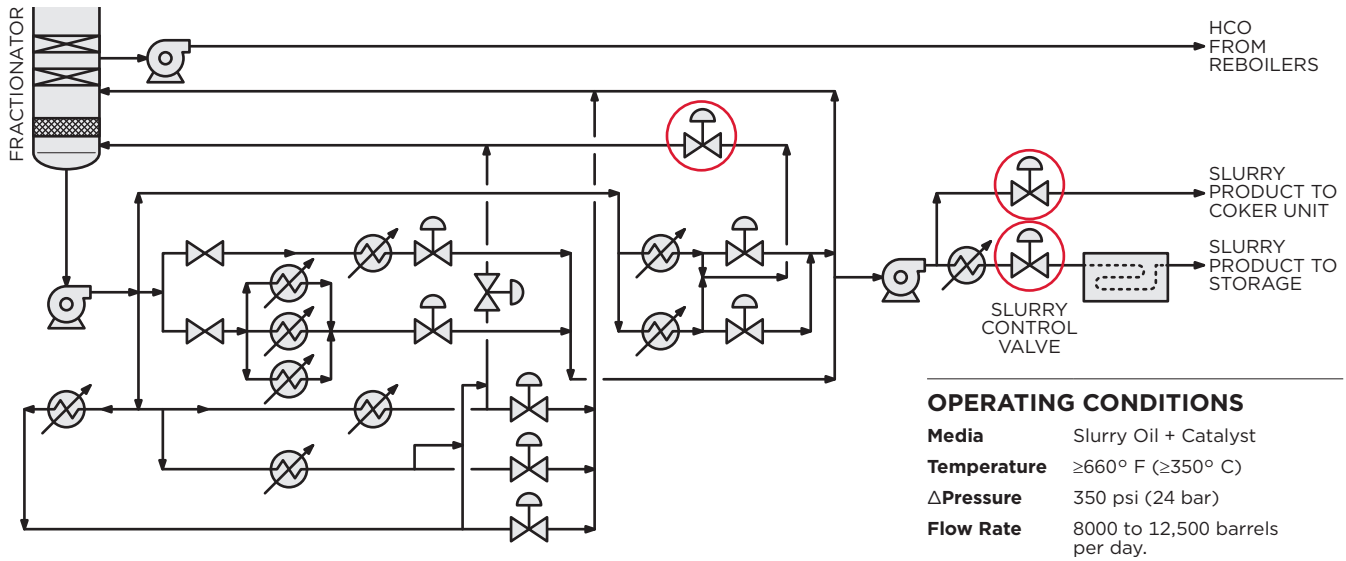
The Bray S19L Segmented Ball Control Valve was customized for the FCC slurry control application.

APPLICATION

Slurry control for Fluid Catalytic Cracking Unit (FCCU) at a major refinery.

The FCCU is one of the key process units in most petroleum refineries, converting low-value, heavy hydrocarbons into lighter weight, value-added petroleum products. High temperatures and fluidized, fine catalyst combine to create a highly abrasive and erosive media.

TYPICAL FLUID CATALYTIC CRACKING UNIT (FCCU) APPLICATION



OPERATING CONDITIONS

Media	Slurry Oil + Catalyst
Temperature	≥660° F (≥350° C)
ΔPressure	350 psi (24 bar)
Flow Rate	8000 to 12,500 barrels per day.
Cycles	Continuous runtime for 3 to 5 years.

© 2026 BRAY INTERNATIONAL. ALL RIGHTS RESERVED. BRAY.COM

CHALLENGE

Ideally, the FCCU runs continuously for 3 to 5 years between scheduled shutdowns for routine maintenance. However, a competitor's slurry control valve was failing frequently, due to erosion from the abrasive media and leaks from the packing/ stem area. The failures, occuring at approximately 4-month intervals, were costly — requiring unscheduled shutdowns and valve replacement each time.

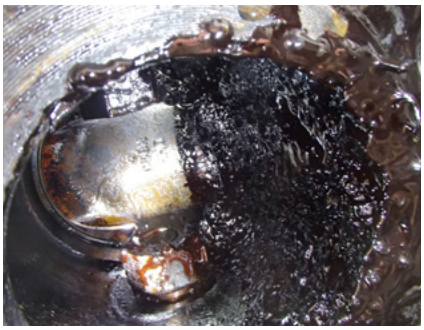
SOLUTION

The Bray Technology and Controls Group researched the problem, using Computational Fluid Dynamics (CFD) to simulate the flow and pressure of the failed valves and the proposed solution.

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

1. Characterize the ball segment for improved process control, minimizing high velocity and cavitation.
2. Reverse the flow direction to minimize erosion on the valve wall and face of the ball segment.
3. Install a replaceable tungsten carbide bore liner downstream and tungsten carbide seat to increase abrasion resistance.
4. Add proprietary surface coatings to further increase abrasion resistance.





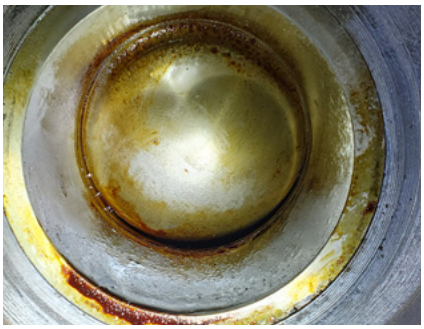
These images show signs of erosion on the valve body, ball segment, and seat.

RESULTS

The customer installed the proposed valve, with reversed flow direction per Bray's recommendation, and saw dramatic improvements in performance.

- All inspections, scheduled at 4-month intervals, continued to reveal **minimal signs of abrasion**, allowing the valve to return to service each time.
- After five years in service, the Bray valve has increased the lifespan over the previous valves **15x.**
- **Eliminated costly shutdowns** for frequent valve replacement.
- Based on outstanding results, the **S19L** design solution became the customer's new **standard specification** for FCCU slurry control applications.





These images show minimal signs of abrasion to the valve body, ball segment, and seat. After each inspection, the valve returned to service.

ESTIMATED TOTAL SAVINGS PER VALVE

TOTAL COST OF OWNERSHIP	COMPETITOR	BRAY
Annual removal cost (every 4 months)	$17,580 (3 x $5860)	—
Annual installation costs (every 4 months)	$18,360 (3 x $6120)	$23,155 (One Time)
Annual replacement cost (every 4 months)	$54,000 (3 x $17,000)	—
Total Maintenance Costs for 1 Year	$89,940	—
Total Costs for 5 Year Lifespan	$449,700	$23,155
Estimated Total Savings for 5 Years		**$426,545**

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

© 2026 BRAY INTERNATIONAL. ALL RIGHTS RESERVED. BRAY.COM