



OPTIMIZING CRUDE BLENDING OPERATIONS SAVES \$1.5M IN 5 MONTHS WITH MICRO MOTION



Application

A large refiner in the United States wanted to make changes to his crude oil blending operations in order to have improved control of the feedstocks for each of his 3 crude distillation units.



Challenge

The refiner has 10 crude oil tanks from which to draw feedstocks into 3 different crude units. The quality and properties of the crude in each tank is highly variable, and also has a significantly different value. When the differential between different crude stocks can be \$5-\$15/barrel, precise measurement becomes important.

Because of the variability in the physical properties of the crude, the volumetric flow meters used to meter each of the blend components were unreliable. The refiner used a combination of ultrasonic and differential pressure orifice meters, both of which are dependent on fluid properties in order to measure accurately.

Because the meters were unreliable, the blending operators had to use tank levels to gauge the amount of each component which was to be blended. Controlling to a precise ratio with this method was not possible. In addition to that, the operators could not blend one crude stock from a single tank into multiple blends because they would lose their measurement. They needed to improve their flexibility.

Another issue this refiner was running into because of his inaccurate crude oil blending method, was that the crude oil storage tanks were not always becoming empty when they were scheduled to be empty. As a result, they encountered significant demurrage costs, when the crude oil cargo ships had to wait in the harbor for available crude oil storage capacity. Demurrage costs are commonly in the neighborhood of \$30,000 - \$50,000/day.

Having poor control of the feedstock quality lead to a couple of other issues for the refiner. Without knowing what is being fed to the unit, it was not possible to accurately predict or optimize the cuts from the crude tower or the volume feeding the vacuum

RESULTS

Precise ratio of the crude oil components allows the refinery to take advantage of the price differential between different crude stocks

Decreased demurrage costs with improved accuracy and planning for storage tank availability

Improved flexibility for crude unit operation leading to better cuts and improved optimization in downstream units

Improved safety by avoiding production of undesirable products

AN-002023

tower and the coker. The coker also requires a specific formulation of the crude with a controlled amount of heavy residuals, in order to reduce the chances of producing shot coke. Inadvertently producing shot coke can lead to significant operational and safety problems.



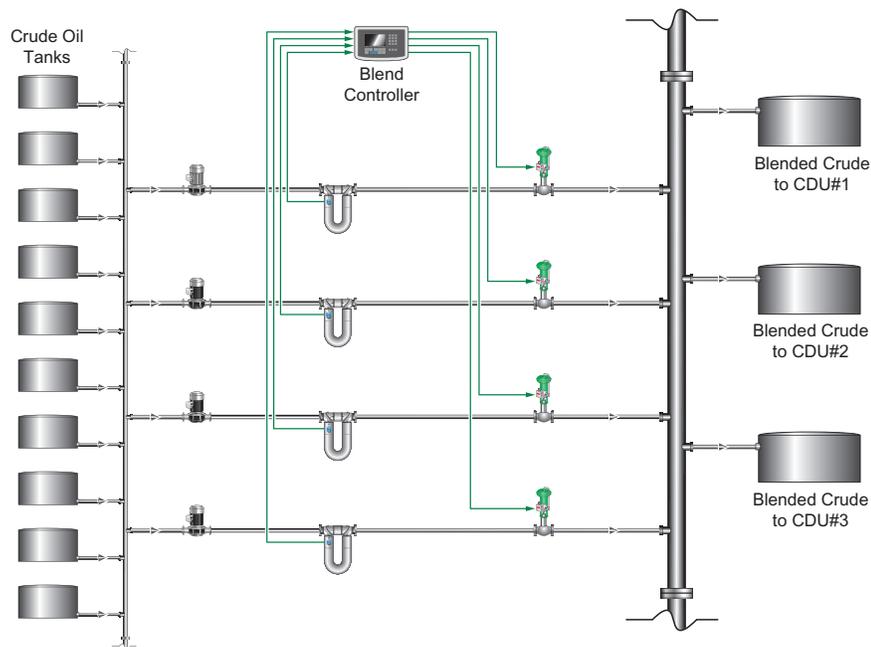
Solution

The Refiner installed 4 high capacity Micro Motion Coriolis meters on his blending run lines. There are 3-CMFHC2 meters, and one CMFHC3 meter, all with 2700 electronics. Each meter can be fed from multiple tanks giving their system the much needed flexibility to run the most cost effective blend taking advantage of significant price differentials.

Accurate flowrates have resulted in more accurate planning and scheduling operations, and more accurate storage tank management. The result has been significantly reduced demurrage costs.

The refiner calculated that the benefit from these two improved conditions of optimized blend ratio control, and reduced demurrage costs led to savings of \$1.5 million in just 5 months, giving them a payback in under 6 months.

Additional benefits that the refiner has realized since the installation of the Micro Motion meters include improved optimization of the crude distillation unit. Steady, accurate rates with a known quality, allows them to run up closer to unit constraints, requiring less allowance for error in planning. Also, board operators can leave flow rates on set point, allowing them to focus on other things.



AN-002023