Partnering Now
Oil & Gas Refining

VACUUM COLUMN DEBOTTLENECKING

How membrane fractionation unlocks a distillation alternative to increase yield and expand the crude slate

THE SITUATION

Vacuum distillation columns are among the refinery's most capital-intensive and energy-intensive assets - and among the hardest to debottleneck. Their separation sharpness directly determines how much high-value distillate a refinery extracts per barrel, and their capacity constraints limit how aggressively a site can process heavier crude slates. Membrane fractionation offers a new lever: compact, low-energy separation deployable alongside existing column infrastructure. Via Separations is developing a suite of hydrocarbon fractionation applications on the same ViaForge™ platform.

THE PROBLEM

- **Constrained Distillate Yield** – The vacuum column's separation sharpness limits high-value distillate recoverable per barrel, particularly from heavier crude slates.
- **Asphaltene Feed Limitations** – Elevated asphaltene content in heavier crudes constrains how aggressively a refinery can run the vacuum unit without overloading the ADU or constraining asphalt and coke production
- **Residual Value in Heavy Streams** – Diesel-range molecules entrained in streams like HAGO represent recoverable product value that current distillation cannot economically capture.

THE APPLICATIONS

Diesel Recovery from Heavy Atmospheric Gas Oil (HAGO): Membrane fractionation recovers entrained diesel-range molecules, increasing diesel yield without additional distillation capacity - a high-value refinery application for membrane fractionation.

Asphaltene Pre-Removal from Crude: Membrane separation removes asphaltenes upstream of the VDU - enabling (1) heavier crude processing without overloading the ADU or (2) increased production of asphalt and coke.

Metals Removal from Crude Feed: Membrane pre-treatment of crude oil or heavy fractions removes trace metal contaminants - protecting downstream catalysts from poisoning, extending catalyst life, and reducing equipment fouling.

RESULTS AND TARGETS

80%	Diesel Recovery from HAGO (target)
95%	Asphaltene Removal
> 99%	Removal of Ni and V Catalyst Poisons

OUR TECHNOLOGY – Powered by ViaForge™ Resilience

Hydrocarbon streams swell, plasticize, and destroy conventional polymer membranes - making fractionation historically inaccessible to membrane technology. ViaForge™ membrane technology is engineered to resist these failure modes, maintaining separation selectivity across crude fractions and intermediate hydrocarbon streams encountered in refinery operations.

VIA SEPARATIONS

64 Pleasant St. Suite 200, Watertown, MA 02472
sales@viaseparations.com | www.viaseparations.com