



Merrick & Company performed process engineering and design services for the integration of Sinclair's new 11,000 bpd gas oil Hydrocracker and new 26 MMscfd Hydrogen plant.

Crude Unit: Preheat Train Study: Merrick performed a process study to evaluate the configuration of the heat exchangers in the preheat train of one of the crude units. A simulation model of the crude unit was built and a pinch analysis was performed. From this analysis, it was discovered that the existing preheat train could be modified to save sufficient heat in the crude heater to allow a significant increase in unit capacity.

Hydrogen Balance and Mass Pinch

Design: Merrick performed a refinery-wide hydrogen production and hydrogen utilization balance. The quantity of each hydrogen stream, the available pressure, and the concentration of each hydrogen stream were all considered to effectively cascade and conserve this refinery commodity. An efficient overall design option was implemented by Sinclair.



Hydrocracker Designs: Merrick was asked to assist Sinclair in several hydrocracker design projects. Among these were the evaluation of a hydrocracker feed filtration, the redesign of the six-stage hydrocracker compressor (four separate services), pressure and temperature validation of the hydrocracker equipment, and design of the feed controls for the hydrocracker.

Hydrotreater Changes: Each of the three hydrotreaters was reconfigured for processing full-range naphtha, distillate, and gas oil; this included new feed control systems. Cascading hydrogen usage was also a key to effective operation of these units in the future. The process designs involved process simulation, catalyst performance evaluations, equipment modifications (Code Case 2290), utility systems, and cost estimates of various case studies.