

Executive Summary

Progressive crude distillation was proposed in 1987 as a possible energy saving alternative to the conventional crude distillation model present in the vast majority of refineries. Theoretical predictions indicated that progressive distillation could reduce the utility burden and also result in the extraction of more valuable light end components. This proposition was tested by designing and simulating a specific progressive distillation scheme. It was determined that the simulated scheme did produce utility savings of approximately 7% compared to conventional distillation for a heavy crude, while utility consumption increased by approximately 6% for a light crude. The production of gas oil did increase slightly in the progressive scheme for light crude, but not substantially enough to compensate for the increased energy losses.

Because of the apparent energetic savings presented by a progressive scheme for processing a heavy crude, economic calculations were performed to determine whether implementation of such a scheme is a worthwhile investment. It was determined that use of the progressive scheme could reduce annual hot utility costs by roughly \$11 million. These savings in operational costs must be compared to the amount of capital necessary to build a progressive scheme. The primary capital investments for the progressive scheme are the addition of columns and the expansion of the cooling utility. These capital costs were determined to be approximately \$5 million, yielding a pay-out time on the investment of less than 6 months. Consequently, the implementation of a progressive scheme for the processing of heavy crudes is strongly recommended.