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Improving refinery productivity through better utilization of crude oil blending using linear programming.

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2014-12
http://hdl.handle.net/10539/18386

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ABSTRACT

Refinery Linear Programming (LP) Models and other mathematical techniques for optimization have evolved over many years to create solutions for complex crude oil blending problems. The objective of this case study was to develop a mathematical single period programming model to simulate blending problems to ensure the greatest possible revenue is generated. The yield of products at a refinery, given stringent environmental regulations on product qualities, the reducing availability of quality light, sweet, feedstock make refinery optimization a significant exercise to perform in order to stay in business. In this work a representation of a case study refinery model was presented, in which the overall gross profit margin, density, and sulphur content of the products were calculated, and evaluated to ensure they fall within the market specification and demand. The model is also able to predict operating variables like the cut-point temperatures in the Crude Distillation Unit which will result in the best outcome for the given scenario. The model formulation is illustrated, scenario based evaluations performed, and results discussed.