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Petro Refinery LLC - Linear Programming Exercise

Petro Refinery LLC is a Kazakhstan-based oil refinery. Its main focus is on providing refined petroleum products to markets in China, the United States, and several European Union countries.

The president of Petro Refinery hosts weekly meetings with select team members. This week he is prepping his colleagues and two outside consultants, both recent Ross Executive MBA grads, for an upcoming evaluation of the refinery operations. The goal is to maximize the firm's financial performance.

Dimitri (President): Hello everybody, thank you for coming. I would like to introduce you all to Jennifer and Miguel -- consultants who will help us look for areas of improvement in our business. Both of the consultants have experience with process optimization. Jennifer has years of experience in the energy sector, and Miguel comes to us from the automotive sector.

My assistant will be sending out several documents. First document will provide a brief overview of the refinery business. Second document covers the crude refining process. Third document covers our firm's current production possibilities and costs. Those who are familiar with the details of the refining business can ignore the first two documents and focus on the third.

For our next weekly meeting, please work with the consultants to come up with suggestions on how our financial position can be optimized. In your analysis, please assume that the prices we pay for crude oil will stay the same. Furthermore, assume distributors will pay us the same rates for each gallon we sell them. Please carefully review the production possibilities and costs document for more details, along with Tables A, B, and C on page four.

Refinery Business Overview¹

A refinery is basically a factory. Just as a paper mill turns lumber into paper, a refinery takes crude oil and turns it into useful petroleum products such as diesel.

Different crude oil input produces different volumes of petroleum products. Crude oil is classified by density (light, medium, or heavy). If the input is a barrel of light crude, more products such as gasoline will be produced. If the input is a barrel of medium or heavy crude, more products such as diesel will be produced. The most modern refineries can turn more than half of every barrel of light crude oil into gasoline.

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