7.1 Case: The NORICOR refinery[1]

Nuevo Rico, a country of 18 million inhabitants, is located in South America. The national currency is the scudero (S). Transactions with outside markets are conducted primarily from the capital, Sanfación, which has modern port facilities.

Nuevo Rico exports mainly raw materials (oil, ore and sugar) and semi-finished products. Imports chiefly consist of finished products. The country's payment balances have deteriorated lately owing to the explosion of the import market, while exports have posted only moderate growth as they are constantly subject to world price variations.

Nuevo Rico's annual production of crude oil, extracted from the San Juan basin (see map), is 28 million barrels per year. Until now, this production was mostly exported. The country does not yet have modern refinery facilities, and so paradoxically Nuevo Rico must import certain refined petroleum products to supply some of its own needs.

In political matters, Nuevo Rico is viewed as a fragile presidential democracy. Its current president, His Excellency Ramon Alcazar, a former Army general, governs the country with an iron hand. Opposition voices are, however, becoming increasingly vocal in their dissent with certain policies. Some members of the President's entourage, particularly his right arm, Colonel Juanitos, are being accused of corruption.

Until last week, Col. Juanitos was personally in charge of the Department of Energy, where he dictated major policy. The petroleum sector was one of his primary responsibilities, and he devoted much interest to it. His cabinet received directly all the decisions concerning the industry. The activities of the state corporation, known as the Nuevo Rico National Petroleum Corporation (NRNPC), were limited to distributing production to the domestic market. Another state corporation, NORICOR, was exclusively dedicated to refinery activities, and had no say in crude oil purchases or product re-sale.

Very recently the newspapers announced that Colonel Juanitos had to suspend his activities for personal reasons and for an undetermined period of time. Word out of public areas in Sanfación was that his withdrawal was a strategic move in the wake of corruption allegations and the opposition's rise in power, a phenomenon supported by public opinion.

Furthermore, for some time President Alcazar had been pressured by the IMF, which asked him to restructure the oil industry. The president therefore decided to entrust this task to an "Oil

[1]This case was written by Michèle Breton (HEC Montréal) and Dian Raynaud.

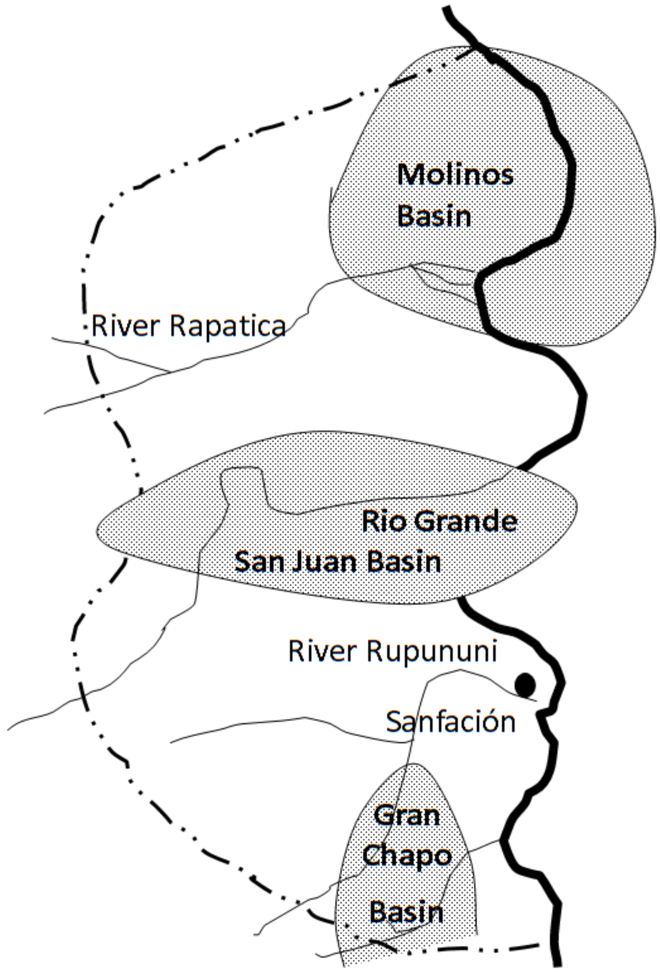

Figure 7.1: Skeleton map of Nuevo Rico.

Committee" mandated to formulate the main policies of a strategy aimed at shoring up Nuevo Rico's petroleum industry.

The Committee's first mandate was to define the government entities responsible for the following functions:

- Extracting, producing and marketing crude oil
- Refinery activities
- Buying crude oil and finished products

- Distributing finished products to the domestic market.

The Committee's second mandate was to recommend specific policies that should be applied forthwith by these entities. They were also to evaluate the potential savings arising from the new policies and help implement them. In addition, General Alcazar decided to ask the Committee for a public response to the allegations of corruption marring the activities of the Department of Energy. The General appointed the following individuals to the Oil Committee:

- Colonel Diaz, Vice-president of the Nuevo Rico Central Bank;
- Captain Alvares, Chief of Staff of the Department of Finance;
- Maria Fatima, an analyst with the Plans Department;
- Luis Tortilla, a former Chief Executive Officer with NORICOR, dismissed in 1982 following a conflict with Colonel Juanitos;
- Alonzo Perez, an assistant to the Minister of Energy and recent graduate from an energy management program at a prestigious North American university;
- Colonel Zacco, an official with the Department of Transportation;
- Vittoria Alcazar, a recently appointed oil fields administrator and, coincidentally, the General's sister-in-law.

Colonel Diaz was chosen to be the Committee's spokesperson and the chairman, due to his visibility. Alonzo Perez was appointed Secretary of the Committee. It was agreed that all decisions would be taken based on a majority vote.

Following a preliminary meeting, Alonzo Perez prepared the enclosed general information regarding the industry as well as some brief comments on the manner in which it was being governed under the hand of Colonel Juanitos.

Department of Energy, Republic of Nuevo Rico

EXTREMELY CONFIDENTIAL DOCUMENT
LIMITED DISTRIBUTION

February 20, 20XX

Memo from: Alonzo Perez
Ministerial Assistant
To: Members of the Oil Committee

Please take a look at the enclosed document which contains the following information we judged useful at the last Committee meeting:

1. Nuevo Rico's crude oil
2. NORICOR refinery
3. The NRNPC
4. Current outlook
5. Constraints imposed by existing contracts

I am also enclosing a list of questions and concerns that arose during our last meeting, and a letter I received today from NORICOR's Operations Manager. I propose that during the next meeting, the Oil Committee set some deadlines for carrying out its mandates and planning contacts.

I believe that many of our questions may be answered through an integrated model of the NORICOR refinery and the NRNPC's activities, using linear programming and studying the following three scenarios with the help of this model: **i)** The first scenario is to represent the current situation of the Nuevo Rico oil industry while considering the possibility of importing San Theodoros crude, if necessary; **ii)** another scenario would be to terminate the contract with Central American Oil; **iii)** the third scenario is to answer the question raised last week by our colleague, Ramon Tortilla, who is forecasting a possible rise in the minimum standard for the octane number of regular gas in Nuevo Rico, which would increase from 86 to 88 by decree.

Yours truly,

Alonzo Perez, Eng.
Secretary, Oil Committee

<u>EXTREMELY CONFIDENTIAL DOCUMENT</u>

<u>TO BE DISTRIBUTED PERSONALLY AND EXCLUSIVELY TO MEMBERS OF THE OIL COMMITTEE</u>

A. Nuevo Rico's crude oil

The country has three sedimentation basins with oil potential. They are, from North to South, the Molinos, San Juan and Gran Chapo basins. Until now only minimum exploration has occurred at the Molinos and Gran Chapo basins, despite promising signs. The San Juan basin is located Northwest of the capital. It produces crude oil from Devonian formations. Operations are in the mature stage, according to the experts, but so far it is the only productive basin in the country. Here are the properties of the crude oil extracted from San Juan:

- Availability: 90,000 barrels/day (4,131,000 tons yearly); however, if we exclude from this amount the quantities already sold under long-term contracts, the remaining availability is 30,000 barrels/day (1,377,000 tons/year), which may be either exported, or refined by NORICOR.
- Properties: 26.3 °API, 1.7% sulfurs.
- Extraction cost: 5.89 S/barrel (42.34 S/ton)
- Value: A valuable source of currency, it is exported from the port of Sanfación. It is generally considered the equivalent of Alberta crude oil currently selling for 13.49 S/barrel at the official exchange rate (97 S/ton).
- Cost of transportation to Sanfación: 0.37 S/barrel (2.66 S/ton).

B. The Noricor refinery

The refinery is located in Sanfación, near the port. It employs 600 people and boasts a reasonably balanced financial picture, with a long-term debt of 400,000,000S, or a debt-capital ratio of 0.6. Inflows are in fact quite stable, and so far they have ensured good coverage of relevant fixed charges. Management is reputed to be competent not only with regard to technical issues, but also to management issues. The technical data for the refinery are as follows (see diagram):

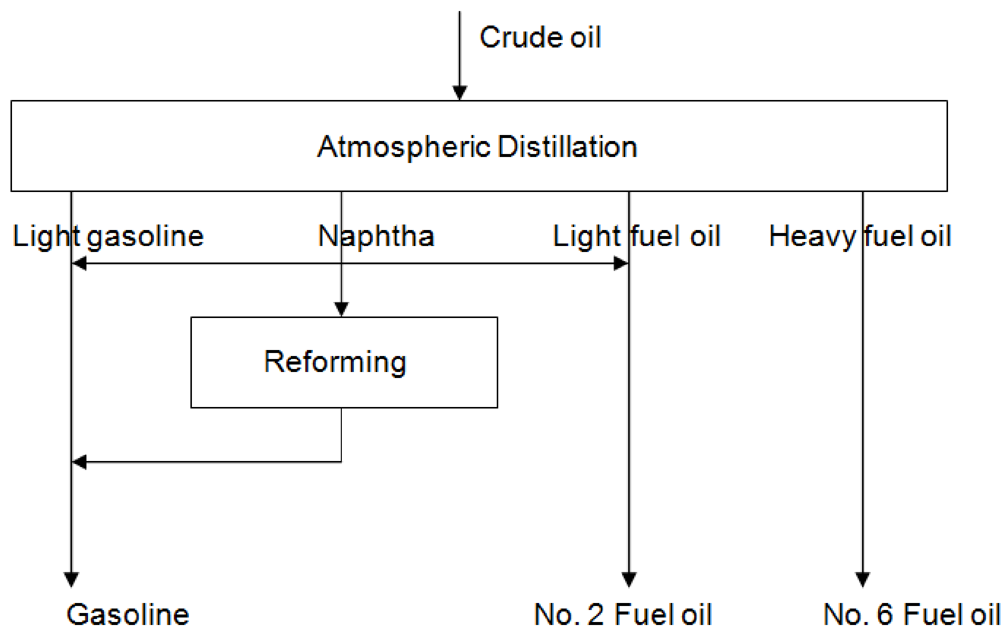

Figure 7.2: Diagram of the NORICOR refinery.

Equipment: Atmospheric distillation (capacity: 1,500,000 t/year); hydro processing and catalytic reforming (capacity: 300,000 t/year).

Yield: Under Col. Juanitos, the refinery treated only local crude (San Juan). The yield (% per weight) of this crude at the atmospheric distillation unit is:

Light gasoline	4
Naphtha	9
Light fuel oil	16
Heavy fuel oil	69
Refinery fuel and effluents	2

The yield of the catalytic reforming unit is 85% per weight of processed naphtha.

Costs: Variable operating costs are 0.095 S/barrel (0.68 S/ton) for atmospheric distillation and 0.13 S/barrel (0.93 S/ton) for catalytic reforming, at full capacity. Fixed operating costs for the refinery total 56,560,000S this year.

Octane: Current laws put the minimum octane content for regular gasoline in Nuevo Rico at 86. Octane content of the three components of regular gasoline produced in the refinery is the following:

Light gasoline	75
Naphtha	58
Reformate	92

C. The Nuevo Rico National Petroleum Corporation

NRNPC statutes state the following with respect to the corporation's responsibilities:

- Distribute products to the domestic market, which is being carried out effectively;
- Sell excess products according to the needs of the country, and import products in the face of shortages;
- Purchase crude oil for refinery needs (an impossible directive, since Colonel Juanitos has decreed that only Nuevo-Rican crude oil can be processed at the refinery);
- Sell crude oil.

Domestic demand (tons/year) is as follows:

Regular gasoline	245,000
No. 2 fuel oil	350,000
No. 6 heavy fuel oil	630,000

The following table presents current prices for imported products, Nuevo-Rican products on the import market, and Nuevo-Rican products on the domestic market (including domestic distribution costs amounting to approximately 3 S/ton), in S/ton:

	Import	Export	Domestic
Regular gasoline	166.7	158.3	142.5
No. 2 fuel oil	141.0	130.0	117.0
No. 6 heavy fuel oil	89.8	86.5	79.9

D. Current outlook

The refinery could procure up to 3,000,000 tons of crude oil per year from San Theodoros, with a density of 34.5 °API, at a cost of 110.17 S/ton (transportation costs included). Variable operating costs would be approximately 0.83 S/ton for atmospheric distillation of the crude oil, which would yield the following (% per weight):

Light gasoline	6
Naphtha	17
Light fuel oil	20.5
Heavy fuel oil	55.5
Refinery fuel and effluents	1

E. Constraints imposed by existing contracts

According to Colonel Juanitos' directives, the NRNPC has entered into a contract with Central American Oil, a small, relatively unknown oil broker belonging to private interests. Under the terms of the contract, the NRNPC will sell between 50,000 and 80,000 tons a year of each of the three products refined by NORICOR, at market value less 10 S/ton. The contract is still in force for three years, but may be terminated prior to the deadline for a penalty of 50,000 S/month, in foreign currency, from the termination date.

F. List of issues the Oil Committee may want to examine

1. Examine the economic and strategic impact of canceling the contract with Central American Oil and a future increase in the minimum octane number to 88 on the refinery's operations and annual profit, and on the Nuevo Rican petroleum industry as a whole.

2. With respect to the request from NORICOR's president, determine whether it would be beneficial to increase the refinery's capacity with regard to either atmospheric distillation or catalytic reforming.

3. We need to respond immediately to the concerns of NORICOR's Operations Manager, who is currently without any guidelines for the next planning period. Specifically, we must designate someone to make the decisions regarding the questions he raises (see enclosed letter in the appendix).

NORICOR Refinery Operations Department

February 18, 20XX

Memo from: Alphonse Dewara
Manager, Refinery Operations
To: Alonzo Perez, Minister of Energy
Re: Refinery Operations

Mr. Perez,

Since Col. Juanitos' departure, we have received no particular directive concerning the refinery and have pursued normal operations. However, I would like to bring up some of the opportunities that are now before us. Please note that we have never made any decisions of this nature single-handedly because of Col. Juanitos' express order that any initiative on our part must first be subject to his approval. I am therefore listing some of the concerns I have, and would appreciate an expedient reply:

- Currently, we do not import any No. 6 heavy fuel oil. Word is that the price of this product may decrease over the next few weeks. At what point would it be profitable to import some?
- At this juncture we are in a position to purchase naphtha with the same properties as the naphtha produced by NORICOR, at a price of 139 S/ton. Is it appropriate to buy some, and if so, how much?
- We have received an offer of crude oil comparable to the crude imported from San Theodoros, at a price of 115 S/ton. Should we buy some? The same question goes for the crude oil from San Theodoros, which is less expensive but available only in limited quantity.

It would be preferable if we could make decisions directly in the refinery in the future because it is usually important to act quickly. Perhaps it may be possible to appoint someone to short-term planning at NORICOR. This individual would have a degree of latitude in implementing general policies issued by the Department.

Thank you for your attention to these matters.

Yours truly,

Alphonse Dewara