1 EXECUTIVE SUMMARY

1.1 Introduction, Background and Study Objectives

SORESCO S.A, a Joint Venture incorporated between RECOPE and CNPCI, intends to expand and modernize the Moín Refinery located in Limon Province, in the Republic of Costa Rica to increase the capacity of the Refinery from 166 m^3/h (25,000 barrels per day, BPSD) up to 400 m^3/h (60,000 barrels per day, BPSD), in order to satisfy the expected domestic demand. After completing the project, SORESCO shall lease RECOPE facilities for a minimum of fifteen years' operation.

The optimized expansion shall permit the fulfillment of the quality specifications of products and obtain a greater value added pursuant to internationally accepted principles of oil refining economy so that the Parties involved can fulfill their minimum profitability expectations, financial obligations, operating and leasing expenditures.

SORESCO has requested HQCEC to conduct a feasibility study of the Moín Refinery expansion project, in the work program for the Feasibility Study, four individual reports will be delivered: Market and Prices Study Report, Process Scheme Study Report, Technical Recommendation of Selected Scheme Report and Feasibility Study Report.

1.1.1 Background

The existing RECOPE's Refinery type is of the "hydro skimming" type with a processing crude oil capacity of 166m^3/h (25,000 BPSD). Because there is not enough hydro-treating capacity and no sulfur recovery complex, refinery only processes some crude with low sulfur content and produces some raw products and blending components. The following process units are part of the existing refinery:

Gas concentration unit: with capacity to process total gases and unstable naphtha coming from all process units.

Naphtha Hydrotreatment Unit and catalytic reforming Unit: with capacity to process 8 m^3/h (1,200 BPSD) of heavy naphtha.

Kerosene Hydrotreatment Unit: capacity to process up to 23.2 m^3/ h (3,500 BPSD) and obtaining a jet-fuel within the Jet A-1 specification.

Viscosity Reduction Unit: capacity to process up to 43 m^3/ h (6,500 BPSD) of fresh load with atmospheric residue resulting from atmospheric distillation.

Vacuum Distillation Unit: capacity to process up to 8,0 m^3/h of heavy crude to obtain

asphalts, gas oils and diesel.

Caustic Treatment Units for GLP and light naphtha with capacities to process 6,6 m^3/h (1,000 BPSD) and 16, 6 m^3/h (2,500 BPSD), respectively.

Utilities: cooling water, fuel oils and gases, steam process water treatment, power, compressed air, fire system, gas and flare relief systems, separation and primary treatment of pluvial and oily water. Refinery now has a distributed control system (DCS). The tank backyard area has a global capacity of around 475,000 m^3 (3 million barrels).

SORESCO has therefore decided to move the project forward to the feasibility study phase, and has contracted China Huanqiu Contracting & Engineering Company (hereafter known as HQCEC) to conduct this study.

1.1.2 Overall Objectives

Project objectives are as follows:

a) Expanding the Refinery and the associated utilities to support a capacity of 400 m^3/h (60,000 barrels per day of crude oil processing, BPSD).

b) Producing fuels according to new requirements, offering significant improvements regarding product quality, and following international standards which minimize environmental impact.

c) Improving competition and profitability of the Moín Refinery through:

- An increase of the production share in covering the national demand of liquid fuels.
- Facility adjustment for the economic/heavier crude oil processing with bottom conversion processes which upgrades residual products to medium distillates of higher market value.
- Minimizing surplus and export, if necessary.
- Reaching profitability for the existing assets and new investments, attracting long term credits, and possible third parties investment in industrial specialized services.
- Reduction of crude oil import and finished goods costs.

- Development of the Moín Refinery taking into account the offer of bio-fuels and other existing replacement products in the fuel market.
- Permitting the future escalation of the plant in such a way that it can be developed.

1.1.3 Objectives of Process Scheme Study

Study Objectives are as follows:

- Utilize an independent study of the potential markets for the proposed refinery; perform an evaluation of several potential refinery configurations.
- Select one of the potential refinery configurations for detailed analysis, including: definition of process units, utility and offsite requirements, emission estimates, labor estimates, land requirements and construction staffing.
- Develop investment estimate with an accuracy of +/- 35% in the linear programming model according to "AACE International Recommended practice No.18R-97.
- Develop cash flow models to define and rank the profitability of each proposed configuration for economic optimization.

1.2 Definition of Refinery Configurations

The detailed feasibility study began with an initial optimization effort in which four different refinery configurations were evaluated. These were acceptable to SORESCO and were the schemes evaluated as part of the initial optimization effort to identify a preferred refinery configuration for the refinery.

The refinery configurations primarily represented high conversion refineries maximizing diesel and gasoline production in line with the product goals outlined in the market report. The configurations differed primarily in the bottom of the barrel processing option used in each configuration.

The four configurations are as follows:

- Case A –COKER+HCU
- Case B –COKER + MHC + FCC
- Case C –Flexi-coking +HCU

Case D –LC-fining + HCU

For each configuration, the following process units are also included:

- Atmospheric Distillation Unit
- Vacuum Distillation Unit
- Saturated Gas Plant
- Hydro-treaters for (naphtha, and diesel fractions) or distillate mild hydro-cracking for enhancing diesel cetane number and producing Jet-A1
- Catalytic Reforming units
- Isomerization Units (C_5/C_6's)
- Hydrogen Generation (via gas or LPG or possible naphtha)
- Sulfur Recovery Complex (SRU, ARU, SWS)

In addition to the process units, all of the configurations include the required utility systems required to support the facility (e.g. power supply, steam generation, cooling water system, BFW system, condensate recovery, compressed air /N_2 system, etc.).

1.3 Basic Criteria for the Study

The Analysis shall be exhaustive, complete, wholesome and sufficient to guarantee that all necessary elements could be used for making the Project development decision.

To reduce the risk of the investment decision, the analysis shall at least, fulfill the following basic criteria:

1.3.1 By a deeper technical and economic study which includes the following aspects:

- Process technology, sizes and current commercial yields, proven and unforeseen obsolescence.
- TBP cuts and assay analysis of commercial crude oils available in the midterm and long period
- Competitive quality of the products required by local market, pursuant to the international trends suggested by the SORESCO and KBC.

- Quality and Volume Simulation of the fraction in primary and vacuum distillation through ASSAY 2000 software or equivalent.
- Process information and unit yields

The possible licensors of process technology shall be asked to yield information to select the modern and competitive processes with specific, trustworthy and updated information without compromising their acquisition.

Sizing and optimizing of the Refining Scheme are made through a process model, mixture formulation with desirable quality of products and optimization through the RPMS linear programming.

- Operation expenditures (fixed and variable) calculated on unit consumption of each process
- Investments for process units, utilities, general facilities, and outside facilities.
- Costs and general expenditures (financial, warranties, taxes, insurance, licenses, management, control, contingency among others).

1.3.2 Basic information updated as of primary market sources and costs provided by KBC and SORESCO.

- Analysis of local fuel market, based on demand forecasts of products and by-products that the SORESCO, main actors, regulatory entities, national fuel balance and interior price sale.
- International market and price study: a) future availability of crude oils and finished products, transportation costs (shipment and insurance), and forecast of import prices, b) placement of sub-products (coke, sulfur, etc.) and products whose production volume exceeds internal demand (asphalt, naphtha, bunker, etc), transportation costs (freight charges and insurance) and forecast export prices.
- Correction formulas for quality and economic analysis.
- Market costs for process licenses.
- Annual factors of competitive and realistic services.
- Unitary costs of utilities (power, cooling water, fuel, hydrogen) and supplies (chemicals and catalysts) current and forecasted in the area of the Moín Refinery.

- Requirements and costs of direct labor and other fixed expenditures and variables directly related to the refining activity (i.e. maintenance, insurance, safety, supervision and management).

Preparation and presentation of reports according to general guidelines accepted by highly respected international financial institutions.

1.4 Conclusions and Recommendations

The initial study focused on evaluating potential refinery configurations with the goal of identifying a preferred configuration for detailed analysis. For each potential refinery configuration, a distinct Linear Programming (LP) model was assembled and used to evaluate and compare technical and economic optimization.

KBC indicated that potential crudes would be ESCALANTE, VASCONIA, MESA , OLMECA， ORIENTE， VASCONIA， PENNINGTON, and Brazilian crudes including RONCADOR and TUPI. In addition, MARLIM and CASTILLA were recommended by SORESCO. Five kinds of crude oil were selected for evaluation, and HQCEC used their assays for feedstock definition. Feed and product prices, product specifications and product demand were based on the market study prepared by KBC. Utility pricing and other site related input were provided by SORESCO

1.4.1 Conclusions

This preliminary study examined a number of refinery plant options for SORESCO with the aim of identifying a preferred configuration that would be used as basis for further definition to determine the Moín Refinery expansion up to 400 m^3/h (60,000 barrels per day, BPSD) refinery in Costa Rica. The conclusions drawn from the results of this study are as follows:

Initial screening of Case A and Case B potential refinery configurations have shown Max conversion refinery results in reasonable IRR.

- Coker+HCU configuration will have good processing flexibility and will be able to produce enough Jet and diesel with good quality.
- Coker+MHC/FCC configuration will have good processing flexibility and will be able to produce enough gasoline and LPG.
- Case A and Case B have good experience in the technology use and are very popular in the refining industry.

- Case A and Case B have a reasonable investment and acceptable economic return.

1.4.2 Recommendations

Based on the conclusions presented in this report, HQCEC recommends that Case A (case 10) is considered with less investment estimation and acceptable economic return. The products slate and processing flexibility of Case 10 can meet the Moín Refinery's expansion objectives, so HQCEC suggests that Case 10, with reasonable crude slate (1/3 PENNINGTON sweet crude and 2/3 VASCONIA sour crude) and combination of Coker + HCU, would be further studied in the FS report.