



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this thesis, the optimization of crude oil purchasing was introduced. The decision was performed with the consideration of the unit and process constraints in the refinery. Furthermore, the decision was aimed to reach the product demands and specifications. All property calculations used here were blended linearly. As a consequence, the properties that are not additive were calculated by using index number. The deterministic model was conducted first then the Sampling Algorithm is used to find the optimal solution and alternative plan that reduced risk of the stochastic model with the uncertainty in demands and product prices.

The models were tested on the simplified process of the Bangchak Petroleum Public Company Limited. The method of linear blending showed the convincing results compared to the assay report. Optimization results from the deterministic and stochastic models were different. When the uncertainty was considered, the risk curve of deterministic solution provided a lower expected GRM and higher risk. On the other hand, the proposed stochastic model performed better in determining the crude oil purchasing that maximized the expected GRM and minimized the risk over all scenarios. Some concepts and procedures for financial risk management were presented including the upper bound risk curve, the Upside Potential (UP) as well as a new area ratio as means to weigh opportunity loss versus risk reduction.

All planning results showed that the PHET crude and MB crude were the first choice in purchasing. This was due to the high margin of these crudes. Moreover, the results from the model achieved the product specification and operating requirements set by the refinery.

5.2 Recommendations

This thesis can further be developed since more issues remain to be investigated. The following recommendations would be useful for the future work.

In order to make the model more accurate,

1. The production yields should be adjusted so that they are close to the actual production from each processing unit especially for the crude distillation unit and reformer unit.
2. The inventory of crude oil and intermediate storage tanks can be added to the model.
3. The capacity constraint of pipeline between each unit can be considered.
4. In the objective function, the operating cost of each unit can be taken into account.

In addition, the cost information is obtained from historical data that have high degree of fluctuation. In these historical data, there are unidentified factors that could have affected the fluctuation in GRM such as the relationship between crude oil cost and product price and the political policy. Moreover, the link between each product price should be further investigated since the sampling in this work was done for each variable independently.