CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Pinch technology can be used as a tool for process improvement. In this study, column targeting and heat exchanger network designs were employed for PTT gas separation plant unit I. Column targeting was done to check the distillation column performance. Column Grand Composite Curve (CGCC) was used as a tool for identifying the scope for modification. The study showed that all of the distillation columns; demethanizer, deethanizer, and depropanizer column, are already optimized for the design case. The overall energy consumption in distillation columns can be further reduced by heat integration between columns. CGCCs showed that deethanizer and depropanizer column could be integrated; however, with the limit of equipments, the heat integration between these two columns is not feasible.

Heat exchanger network analysis starts by extracting the data from design case-simulation into Aspen Pinch program. The predicted minimum energy consumption for GSP I are 0.00 and 7.80 MW for hot and cold utility, respectively. However, the existing energy consumption of GSP I is 56.15 % excess of the minimum value. In this study, only the heat exchanger network's operating conditions were modified, without the equipment modifications. The result showed that the energy consumption was reduced to the minimum requirement.

In order to show that the heat exchanger network modification can improve overall thermodynamic efficiency, the exergy analysis was conducted. From exergy analysis, thermodynamics efficiency of GSP I before and after modification are 14.013 and 15.908 %, respectively. Therefore, the heat exchanger network modification can enhance the thermodynamic efficiency of the process.

This study yields many benefits to the industrial section. Firstly, it provides the collaboration research between the academic and industrial sector. Secondly, the result from this work can be used as a guideline for process improvement.

There are some recommendations for further study. Firstly, since the model was constructed based on the design operating data, it should be verified by actual operating conditions. Secondly, the cost data that used in this work was extracted from textbooks, which may not be accurate for representing the actual operating cost of the process. Therefore, the cost data should be derived from the process operating condition, which is more accurate to represent the real process. Finally, in order to implement the result, it should be tested for the practical limitation, such as the pressure drop in heat exchangers.