CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

This thesis focus on the retrofit method to design heat exchanger network by using MILP model with GAMS software under the constraint functions of retrofit with / without relocation. When compared to the results of retrofit with relocation and one without relocation, total cost from retrofit with relocation is less than one without relocation. It results from switching the position between heat exchangers in existing network before adding area in existing exchanger or adding new exchanger.

The retrofit method is applied to light crude refinery unit under constraint functions of pump around in both models of retrofit with / without relocation. This gives total cost of retrofitted HEN with relocation lower than one of retrofitted HEN without relocation. The performance of retrofit with relocation gave more energy conservation, lower investment cost and less hot-and-cold-utility consumption.

Finally, the research work to determine the suitable HEN design for handling multi-crude refinery of light, intermediate and heavy crude was done by GAMS model of grassroots and retrofit design of HENs. The best refinery design will be the one with the least utilities consumption and largest energy saving respectively. Three scenarios of feed time ratio of three crude types in one year are used to study the best HENS for this refinery for grassroots design. Scenario 1 of feed time ratio (light: intermediate: heavy) :(3:3:4). HEN1 from light crude refinery is the best HEN for this scenario. Scenario 2 of feed time ratio (light, intermediate: heavy) :(1:8:1). HEN2 from intermediate-crude refinery is the best HEN for this scenario. Scenario 3 of feed time ratio (light, intermediate: heavy) :(0.5:0.5:9). HEN3 from heavy-crude refinery is the best HEN for this scenario. Three scenarios of feed time ratio of three crude types in one year are used to study the best HENS for this refinery for retrofit design. Scenario 1 of feed time ratio (light: intermediate: heavy):(3:4:3). HEN1.2 is the best HEN for this scenario. Scenario 2 of feed time ratio (light, intermediate: heavy): (8:1:1). HEN1.1 is the best HEN for this scenario. And scenario 3 of feed time ratio (light, intermediate: heavy) :(0.5: 0.5:9). HEN1.3 is the best HEN for this scenario. From these results, it can be concluded that the best heat exchanger network for all crude types is varied because of the different production plan of each refinery.