CHAPTER I
INTRODUCTION

As the increase of oil prices and depletion of the world's energy, the energy conservation remains the prime concern for many process industries. For the new industry countries such as Thailand, which has very large energy consumption and the energy sources are imported from foreign countries to meet the domestic consumption, are affected by the high price of petroleum. From this problem, the reduction of energy consumption is important. The industrial company, which consumes a great amount of energy, is looking for the new way to use the energy effectively.

One way for energy management is Pinch technology. It is the practical method that has been applied across a wide range of process industries. Pinch technology is used mostly for the Heat Exchanger Networks Synthesis (HENS) and also be applied for Distillation Column Targeting, Mass Exchanger Networks Synthesis (MENS), batch scheduling, total utilities system design, etc. The prime objective of pinch analysis is to achieve cost savings by process heat integration with maximizing process-to-process heat recovery and reducing the external utility loads. The process pinch point refers to the optimum point in the process design, the temperature level above this pinch acts as heat sink, and the one below it acts as heat source. Based on thermodynamics, Pinch technology matches cold streams needed to be heated with hot streams needed to be cooled, causing high energy recovery. Thus pinch technology can be used to determine the minimum requirements for both hot and cold utilities in a process. An accomplishment in Pinch technology importantly comes from the advancement in computer software. Two of the crucial elements are data reconciliation software and process simulation software. The data reconciliation software is used to turn real time process data into consistent and reliable information. It uses statistically sound techniques to reconcile flow, temperature, and composition measurements to satisfy material and energy balances around each unit in a process plant. The simulation software uses these data to simulate plant process into the worksheet.

This study uses the process data of Reformer area and Aromatics area of ATC The Aromatic (Thailand) Public Company Limited which is reconciled coupled with the Pinch technology for retrofitting the heat exchanger network and distillation column targeting to obtain the best design which results in high degree of energy recovery. The study is divided into two parts. The first part is heat integration in reformer area. The second part is heat exchanger networks retrofit for aromatics area.

The process of aromatics plant can be divided into two parts as shown in Figure 1.1, reformer and aromatics areas.

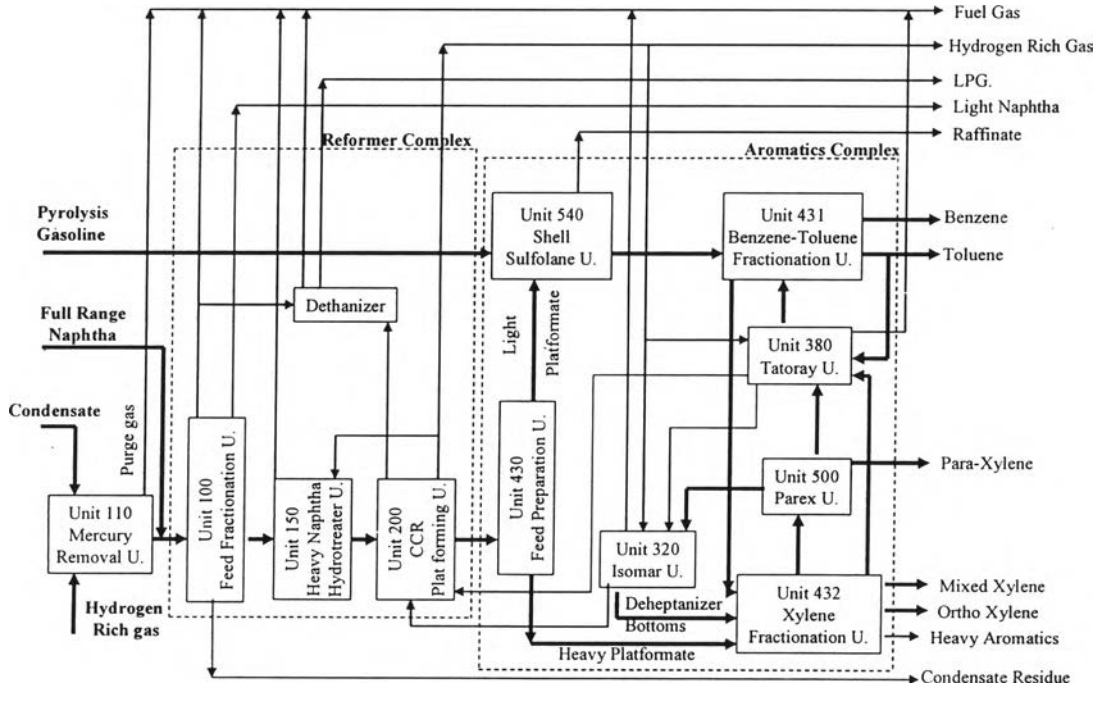

Figure 1.1 The Process Flow Diagram of Aromatics Plant.

Reformer area reforms non-aromatic reactant which is condensate or full range naphtha to the aromatic rich products (reformate) and by products such as fuel gas, LPG, H_2 rich gas and light naphtha Aromatics area are the area that convert reformate to Benzene, Toluene and Xylenes which are the major products of ATC plant.