

CHAPTER I

INTRODUCTION

There has been an enormous increase in the global demand for energy in recent years as a result of industrial development and population growth. As global energy demand continues to grow, actions to increase energy efficiency will be essential. There are also many environmental benefits to energy efficiency including reduced emissions and reduced use of resources.

Energy conservation is also important because consumption of nonrenewable sources impacts the environment. Specifically, our use of fossil fuels contributes to the pollution. Energy conservation and environmental care has become more important for the oil refinery during the energy crisis of the early 1970's. Furthermore energy has been a fundamental driver of economic growth which partially effects to our living. Recently, the global energy demand is increasing continuously so the crude oil price is growing up economically. Due to the current situation, the researchers are motivated to develop more energy-efficient.

Energy conservation can be achieved through increased efficient energy use, in conjunction with decreased energy consumption and/or reduced consumption from conventional energy sources.

For refineries throughout the world, energy management is an important element of controlling total operating costs. Various applications are used to address exchanger network design and process heat integration, thus helping to identify energy-efficient process designs while minimizing operating and capital expenditure. The crude distillation unit (CDU), as shown in Figure 1, is one of the largest energy-consuming units in a refinery, having a complex heat exchanger network (HEN) of crude preheat train which transfers heat from hot-product and pump-around streams to preheat crude before entering the crude distillation column, resulting in energy saving in crude furnace and coolers.

In the middle decades of 20th century, when some of oil refineries operating today were designed, each refinery was considered to process a certain type of crude. In the last two decades, the raw material fed to the refinery changes frequently the characteristics. This modification is explained by the availability of uncertain crude

oil quality on the market and the change in quality of crude from traditional sources. This situation is one of the reasons to retrofit the crude distillation unit (CDU), to increase the flexibility.

In recent years the revamping of existing heat exchanger networks (HENs) has become more important as energy cost continue to increase. Retrofit projects have attracted significant research due to the large savings that can be achieved in utility costs especially after the 1990s. The major objectives of retrofit problems are the reduction of the utility consumption, the full utilization of existing exchangers and identification of the required structural modifications (Ebrahim R.;Sirous S..2009).

The objective of this research is to do the retrofit of crude preheat train with multiple types of crude in order to improve the energy efficiency of the crude preheat train of the crude distillation unit.

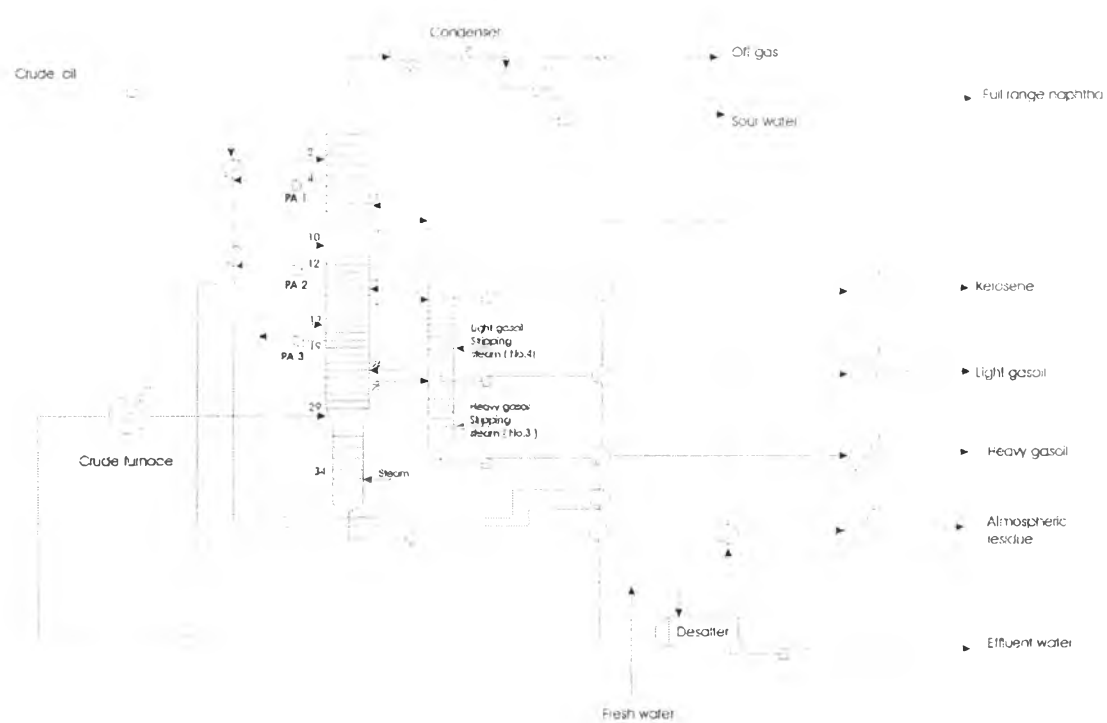


Figure 1.1 Crude distillation Unit (CDU).