CHAPTER I
INTRODUCTION

The wax present in crude oils consists of paraffin hydrocarbons ($C_{18} - C_{36}$) known as paraffin wax and naphthenic hydrocarbons ($C_{30} - C_{60}$). This hydrocarbon wax can be found in two states of matter (liquid or solid) depending on temperature and pressure. When crude oil is frozen, its content especially high molecular weight hydrocarbon change state to form crystals. The crystalline form of paraffin wax is known as macrocrystalline wax. A waxy crude usually consists of : 1) light and intermediate hydrocarbons (paraffins, aromatics, naphthenics, etc.) 2) wax as described above (macrocrystallines and microcrystallines) 3) other heavy hydrocarbon compounds, even though at low concentration including resins, asphaltenes, diamondoids, mercaptans, organometallics, etc.

The problem of paraffin or waxy crude oil is related to production, processing, and transportation in the petroleum industry. For example when the temperature of the pipelines decreases due to the change of season, it provokes the crystallization of some heavy fraction in the crude oil during production. The separation of such fractions constituted mainly paraffin and waxes produces solid deposits that cause the reduction of cross section of flow lines.

Paraffins crystallization depends on crude oil composition, temperature and pressure conditions. Several techniques have been developed to minimize the problems caused by wax crystal deposition or aggregation. Three techniques are generally used: 1) mechanical methods such as pipeline pigging, pipeline scrubbing and flowline pigging 2) thermal method such as applying heat to keep temperature above the pour point and to melt existing wax deposits and 3) chemical method. Chemicals used may provide heat to the wax from chemical reaction or act as a wax dispersant. Polymeric additives were considered in this study. Polymers such as ethylene vinyl acetate copolymer, polyalkyl acrylate copolymer and their derivatives were the main additives used to improve the flowability of waxy crude oil and reduce the problem of wax deposit at low temperature however polymer additives were used equally effective with some crude oils that depend on the composition of crude oil and polymer.

The aim of this work is to evaluate comparatively the influence of the wax inhibitors on physical properties of Thai crude oils. In addition, an attempt will also be made to present or discuss detailed mechanisms how these chemicals produce significant reduction of pour point.