

CHAPTER I

INTRODUCTION

One of the most commonly found problems in oil industry is wax deposition. The main problem of waxy crude oil is wax deposition during transportation and production on the wall of pipelines causing a pressure drop increase or plug the pipelines resulting in lower production or higher consumption of power in the system. Also, wax deposits in tank or storage tank, the accumulation reduces the volume of tank. Moreover, wax deposit in storage tank is difficult to clean.

Types of the wax presenting in crude oil consist of paraffin hydrocarbons (C_{18} - C_{36}), which is generally known as paraffin wax, and naphthenic hydrocarbons (C_{30} - C_{60}). While the crude oil temperature decreases, wax will freeze and these high molecular weight hydrocarbons will crystallize. The crystal form of paraffin wax is known as macrocrystalline wax. Crystalline form of naphthenes is known as microcrystalline wax. There are many factors affecting the crystallization of wax such as temperature of crude, wax concentration, pipe roughness and others.

There are several techniques to minimize wax deposition problem. First, mechanical method is used when wax deposit is still soft, e.g. pigging, wireline cutting, through flowline cutting, and paraffin knife. Second, thermal method is to use heat to keep the temperature of crude to stay above cloud point or to apply heat to melt the existing wax deposits (in the case that wax deposits already). Third, bacterial treatment is a more recent technique where especially cultured microbes are introduced into the well to produce chemical that inhibits wax production or break down the existing wax. Fourth, chemical treatment, wax inhibitor is widely used which can be classified into 3 categories: 1) Solvents which can dissolve paraffin. 2) Wax crystal modifier which are polymers that inhibit or alter wax crystal aggregation. 3) Paraffin dispersants which inhibits the particles from uniting and depositing.

In this study, polymer additives will be examined to solve the deposition problem, the polymers selected were based on the result done by the previous study (Numura, 2005) for example poly (maleic anhydride-alt-1-octadecane: PMAO),

poly(octadecyl methacrylate: POMA), poly (ethylene -co- butyl acrylate -co-maleic anhydride: PEBAMA) etc. However, the efficiency of wax inhibitors is different in term of composition or characteristics of crude.

The purpose of this work was to screen a number of wax inhibitors and to optimize amount and type needed for different crude samples. The inhibiting stabilities of selected additives, the relationships between crude oil characteristics and type of wax inhibitor were also studied.