CHAPTER I

INTRODUCTION

It is well known that a large number of synthetic chemicals are added to different types of lubricants in order to improve the properties of lubricants during their use within hostile environments such as the high temperature and pressure conditions within an internal combustion engine.

Prior to the 1930s, a well-refined mineral oil was sufficient. However, engine demands have increased requiring the use of antioxidants in diesel engine lubricants to prevent oxidation of base oil with consequent formation of corrosive acids and a rapid increase in viscosity. Subsequently, metal soaps were added as detergents to reduce engine deposits, particularly in the piston ring zone. The auto industry introduced increasingly powerful internal combustion engines during the 1950s bringing about the development of highly sophisticated motor oils. Different types of engines require different additives with high speed, high compression engines such as present day aviation gas-turbine engines making extreme demands on mineral oils. As the conditions to which the oil is subjected are made increasingly severe, the amount of additive

included must be increased in order to provide the properties such as those referred above. For example, with respect to aviation lubricants, these are now based on diesters or neopentylpolyol esters with hindered phenolic or amine antioxidants and antiwear additives such as aryl phosphates. Present day petroleum chemists consider such lubricant products to consist of 100% additive blends. The complexity of isolating and identifying additives within modern lubricants is vastly complicated by the fact that pure chemicals are rarely used as additives in modern lubricant compositions. As opposed to the use of pure chemicals, the additives are often in the form of mixtures of a vast number of different but closely related molecular structures to provide improved performance characteristics over a wide range of operation conditions. Such separation techniques are utilized in combination with modern spectroscopic methods such as infrared, nuclear magnetic resonance, mass spectroscopy in order to identify group and determines structures of additives present within such isolated components of modern lubricants.

Objective and Scope of the Research

The objective of this project was determine those formulations from the commercial lubricants by isolating and characterizing the additives. Many analytical methods (such as chromatography, spectroscopy, etc.,) were employed systematically to disclose the formulations.