CHAPTER I

INTRODUCTION

1.1 Introduction

Natural gas is one of the important natural resources of Thailand because it is not only an essential , but also a fundamentaltal element of great benefit to national materials, for instances, chemical fertiliser industry, industries, and etc..

Natural gas processing almost always includes separation operations; the most common of these are distillation, absorption, and extraction. One of the essential ingredients for rational design of such separation operations is a knowledge of the required phase equilibria. For the calculation of phase equilibria, the quantitative phase behavior of natural gas must be known.

For example, in distillation, there are some problems of vapor-liquid equilibrium between natural gas (or light hydrocarbons) fractions in which a dozen or more components may be present. On each stage of a distillation column, an equilibrium is assumed to be reached between vapor and liquid mixtures of these components. The compositions are different in each phase and vary markedly from top to bottom of the column. How are these compositions related? For treating such problems, flash calculation is applied in each tray. Because of multicomponent systems, there are n equations in each tray with n being the total number of components in mixture.

In addition, an equation of state is applied to calculate thermodynamic properties for use in flash calculations. Equations of state are generally complex equations. Therefore, it is a tedious work in each tray because there are many equations to be solved.

To facilitate the solution of all equations in each tray, computers are used. With a microcomputer, it is more convenient when a shortcut method is applied for predicting vaporliquid equilibrium.

1.2 Objectives

The aim of this study is to develop a simple model to scale down the flash calculations. This model would be suitable for use in small computers. The major benefit provided by the developed model is small computing time and as small a memory space computer as possible.

1.3 Scope

This model can be applied to natural gases in the range of low to moderate pressures. The Soave Redlich Kowng equation of state is to be used.