

## CHAPTER 11

### FURTHER WORK

#### 11.1 Introduction

The main aim of this project was to identify potential solvents for alpha olefin purification. The promising results inevitably led to the evaluation of certain solvents on synthetic as well as actual cuts.

#### 11.2 Simulation test on a synthetic mixture

As an experiment it was decided to take a "synthetic" stream and test methanol on it. The input file for this test can be found in appendix D4.

The composition of the feed stream and the overheads is shown in table 10.1 (values are in kg mol/hr) (virtually all methanol was taken overheads):

Table 11.1: Effect of Azeotropic Simulation		
Component name	Feed	Overheads
1-octene	40.2	39.8
2-octene	0.6	0.37
2-ethyl-1-hexene	5.4	5.4
n-octane	5.4	5.12
4-methyl-1-heptene	0.6	0.6
3-methyl-3-ethylpentane	0.6	0.6
diisopropyl ketone	1.8	0.004
di-SEC-butyl ether	1.2	0.16
2-hexanone	2.4	0.0014
n-butanol	0.6	0.0044
2-methyl-1-butanol	0.6	0.0000003
2-pentanol	0.6	0.00043

The table indicates that, as was predicted earlier, the solvents which allow the separation of 1-octene and 2-hexanone also facilitate the removal of other oxygenates. Most difficulty is encountered in cases where the oxygenate is not very polar. This is in agreement with the observations that the difference in polarity between the oxygenate and olefin is important. In these cases the separation is attributed to the difference in the molar volumes between the olefin and oxygenates.

### 11.3 Solvent testing on the actual SLO

Some of the solvents identified by the ASEEK program were also tested on actual cuts using a batch column with 9 theoretical trays. (The author was not involved in these tests.)

The results revealed that methoxyethanol is able to separate oxygenates and aromatics well but that the separation was not complete because small amounts of these components were found in the first overhead fractions. Ethoxyethanol was much more efficient for the separation of the olefin from the n-paraffin and oxygenates in a C10 cut.

Methanol was also shown to be a highly effective agent for separating the C8  $\alpha$ -olefin and n-paraffin from the oxygenates present in the C8 SLO cut.

At the time of this writing much attention is being paid to some of the solvents identified. The high polar solubility parameter of many of these solvents enable them to facilitate the removal of some non oxygenates as well.