CHAPTER V

CONCLUSION

This research involved the production of white oil from Fang light distillate by hydrotreating process in two stages: hydrodesulfurization and hydrogenation.

Because of high quantities of wax in this distillate, it was necessary to remove wax to obtain low pour point of oil by using methyl ethyl ketone as a solvent for dewaxing process. Dewaxed oil contained 0.305% by weight of sulfur, having a pour point of 4°C.

In hydrodesulfurization stage, dewaxed oil was contacted with hydrogen in a batch reactor in the presence of a sulfur-resistant catalyst containing 10% of molybdenum, 5% of nickel and 5% of cobalt by weight supported on alumina. The optimum condition was double hydrodesulfurization at reaction temperature of 350°C under hydrogen pressure of 600 Psig, catalyst concentration of 5% by weight of oil and reaction time 3 hours of each steps. The sulfur content of the hydrodesulfurized oil with a boiling range from 330°C to 450°C was less than 0.001% by weight.

In hydrogenation stage, the hydrodesulfurized oil was operated in the presence of catalyst comprising 0.3% by weight of platinum supported on alumina, to completely convert aromatic compounds to saturated hydrocarbons. This hydrogenation reaction was performed four times at temperature of 300°C under hydrogen pressure of 600 Psig, catalyst concentration of 5% by weight of oil, and reaction time for 3 hours for each steps. After that the low boiling products of the forth hydrogenated oil was removed by reduced pressure distillation to obtain oil with a boiling point range above 330°C. This oil was transparent, colorless, and almost odorless. The maximum UV absorbances of

transparent, colorless, and almost odorless. The maximum UV absorbances of DMSO extract of this oil in wavelength ranges of 280-289, 290-299, 300-329, 330-350 nm were 2.460, 2.370, 1.91, and 0.33, respectively, and direct absorptivity of this oil in iso-octane at wavelength of 275, 295, and 300 nm were 0.444, 0.168, and 0.130, respectively. This hydrogenated oil met all requirements for technical grade white oil.

From this research, it was seen that dewaxed oil of light distillate from Fang Refinery could be used as a raw material for production of technical grade white oil. Because of a large amount of light products in dewaxed oil, this material gave 72.6% yield of technical white oil, 14.3% of light oil, 9.5% of gas, and residual fraction of high boiling point above 450°C which was separated in hydrodesulfurization stage.

It was noted from this research that there were several steps in both of hydrodesulfurization and hydrogenation stages because of the limitation of hydrogen pressure and a type of used reactor. Due to the better result, the hydrogen pressure should be operated more than 600 Psig and the batch reactor should be replaced by the continuous fluidized bed reactor.