TECHNICAL AND RESEARCH DIVISION

ENGINEERING DEVELOPMENT GROUP (NY. OFFICE)

REPORT NO. 1

HYDROGENATION OF CARBON MONOXIDE CORRELATION OF SYNTHESIS DATA

I. INTRODUCTION

Many theories have been offered to explain the mechanism and effect of operating variables on the Fischer-Tropsch synthesis of H_2 and CO to hydrocarbons. In the literature however, such theories have been based exclusively on data obtained with fixed catalyst beds and principally with cobalt catalyst.

Several runs have now been made with a fluidized catalyst bed using iron catalysts in the stirred reactor unit #7 and the baffled reactor unit #8 at The Texas Company, Beacon Laboratory. It was interesting to see how these results compared with those obtained by others. To accomplish this comparison, the data were plotted up on a large number of graphs hoping that an analysis of these graphs might empirically lead to correlations which would enable the prediction of yields and product distributions as well as throw some light on the nature of the reactions.

The potentialities of this approach have not been exhausted and there is still much left to be accomplished. However, because of the interest in this development at this time it appeared advisable to report the results to date so that others may make use of the many graphs developed in similar studies. As more data are obtained, it may be necessary to modify and extend some of the relationships presented here but it is believed that continued study along the lines set forth will prove quite profitable.

Scope:

For the present, emphasis has been placed on the development of correlations based on Fresh Feed composition and those other operating variables which are subject to direct control.

Attention has been confined to factors affecting yields and distribution of products. No data are presented on quality of products.