PERSONAL AND CONFIDENTIAL

HYDROCARBON SYNTHESIS

PARTIAL REPORT NO. 2

Montebello Research Laboratory — Experiment No. 2001
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EFFECT OF REDUCTION TEMPERATURE ON SYNTHESIS CATALYST RUNS 63, 64, 65, AND 66

I. INTRODUCTION

Production at the Carthage Hydrocol, Inc., synthetic fuels plant at Brownsville, Texas, had not reached the design yield level, nor had it reached the levels obtained by various pilot units using the same catalyst base stock. It was believed possible that the method of catalyst preparation at Brownsville was at least partially responsible for the poor yields.

For this reason Montebello Laboratory made a run with a hydrocarbon synthesis reactor, evaluating Bethlehem mill scale catalyst promoted, sized, and reduced at Brownsville. All treatment prior to the synthesis operations was the same as at Brownsville.

It was desired to increase the capacity of the catalyst reduction facilities at Brownsville, and one possibility was to use higher reduction temperatures. In order to ascertain the time advantage to be gained by higher temperatures and also to determine any deleterious effects on catalyst activity, Montebello Laboratory made three runs with a synthesis reactor using catalysts reduced at different temperatures.[1]

[1] Detailed data on the catalyst reduction rate were presented in TDC 802-45-P.

During the latter part of one of the runs, the effect of recycle/fresh feed ratio was investigated by doubling the flow rate of recycle gas. The data were compared with other data from a run in which the recycle rate had been reduced to practically nothing. Extensive investigation of the effect of recycle/fresh feed ratio had not been made at Montebello because the facilities at the commercial plant at Brownsville were not flexible enough, anyhow, to allow much deviation from the design recycle ratio.

This report concerns Runs 63, 64, 65, and 66 made between October 19, 1951, and February 2, 1952.