STRICTLY CONFIDENTIAL

HYDROCARBON SYNTHESIS

PARTIAL REPORT NO. 32

Montebello Laboratory
Work Completed Feb. 2, 1949

Experiment No. TDC-802
Report Approved May 26, 1950

REVIEW OF SYNTHESIS OPERATIONS IN MONTEBELLO REACTOR NO. 3 - RUNS 44 AND 45

I. INTRODUCTION

A. Object

The object of the work described in the present report was to study the synthesis of hydrocarbons from carbon monoxide and hydrogen in Montebello Reactor No. 3 with mill scale catalyst.

B. History

The original Montebello synthesis reactor (No. 1) consisted of a 10" x 30' schedule 60 pipe fitted with three longitudinal 2" steam cooling tubes.1/ This reactor was generally satisfactory but some difficulty was encountered in obtaining the desired temperature levels because of excessive cooling surface and heat loss.

After Run 28 was completed, this reactor was dismantled, and an attempt was made to operate a 12" reactor (No. 2) fitted with a single, helically-coiled 1" steam cooling tube which had been designed to simulate a horizontal reactor proposed for the Carthage Hydrocol plant at Brownsville, Texas. This proved to be inoperable in Runs 29 through 38 because of inadequate performance of the cooling system.2/

Tests were then made on the 16" Stratco reactor.3/ This mechanically-agitated, oil-cooled, draft tube reactor was found to be operable, and catalyst losses were considerably less than those

1/Partial Report Nos. 5 and 13, Experiment No. TDC-802.
2/Partial Report No. 14, Experiment No. TDC-802.
3/Partial Report No. 31, Experiment No. TDC-802.

previously experienced, but conversion and yield levels were generally low as shown by Runs 39 through 43.

C. Scope

The present report discusses the work conducted with promoted mill scale at 300 psig in the Montebello Reactor No. 3, a 12" vessel 19 feet long containing three 2" cooling tubes. Run No. 44 has been considered a shakedown and personnel training run preparatory to Run No. 45, the first sustained experiment on this reactor. Data from Run 44 were considered of insufficient validity to warrant inclusion in the report. The work was done during the period of time extending from December 13, 1948 to February 2, 1949. The report includes operating, yield, and analytical data from both the generator and reactor systems.