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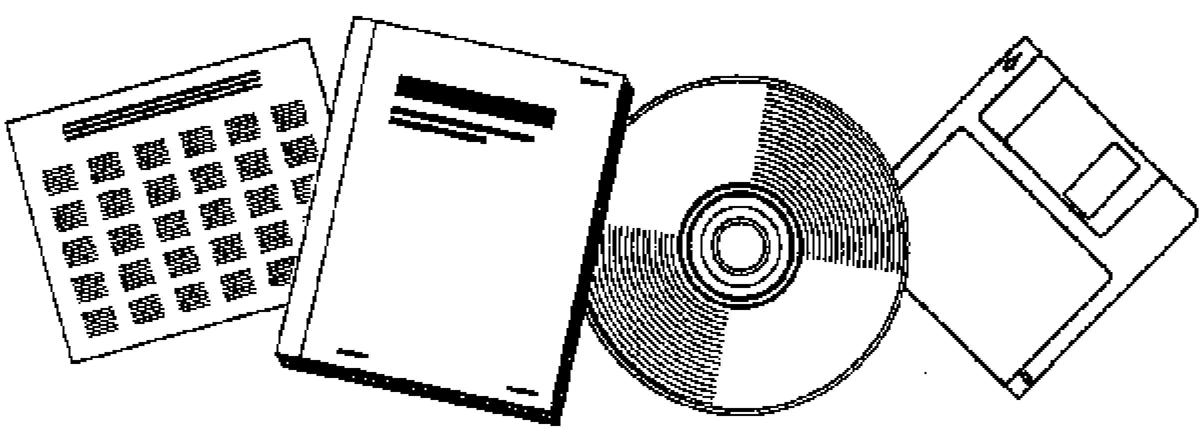
UOP, INC.
DES PLAINES, IL

06 JUN 1988



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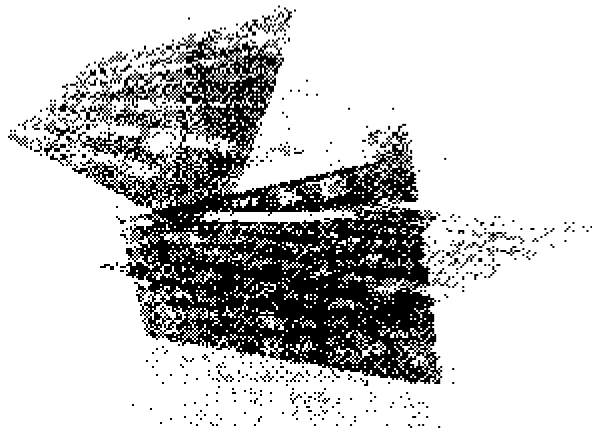

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FISCHER-TROPSCH WAX CHARACTERIZATION AND UPGRADING

Final Report

By
P. P. Shah
G. C. Sturtevant
J. H. Gregor
M. J. Humbach
F. G. Padrta
K. Z. Steigleder

June 6, 1988

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For
U. S. Department of Energy
Pittsburgh Energy Technology Center
Pittsburgh, Pennsylvania

By
UOP Inc.
Des Plaines, Illinois

and

Allied-Signal Engineered Materials Research Center
Des Plaines, Illinois

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FISCHER-TROPSCH WAX CHARACTERIZATION AND UPGRADING FINAL REPORT

PREPARED FOR THE
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UNDER CONTRACT NO. DE-AC22-85PC80017

PREPARED BY:

P. P. Shah, G. C. Sturtevant,
J. H. Gregor and M. J. Humbach
UOP Inc.
Des Plaines, Illinois

and

F. G. Padrta and K. Z. Steigleder
Allied-Signal Engineered
Materials Research Center
Des Plaines, Illinois

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FISCHER-TROPSCH WAX CHARACTERIZATION AND UPGRADING
FINAL REPORT

ABSTRACT

The characterization and upgrading of Fischer-Tropsch wax was studied at UOP Inc. and the Allied-Signal Engineered Materials Research Center. The focus of the program was to maximize the yield of marketable transportation fuels from the Fischer-Tropsch process. The program was sponsored by the Pittsburgh Energy Technology Center of the of U.S. Department of Energy.

The Fischer-Tropsch wax was characterized using gel permeation chromatography (GPC), high resolution mass spectrometry (HRMS), infrared spectroscopy (IR), gas chromatography (GC), nuclear magnetic resonance (NMR) and various other physical analyses.

Hydrocracking studies conducted in a pilot plant indicate that Fischer-Tropsch wax is an excellent feedstock. A high yield of excellent quality diesel fuel was produced with satisfactory catalyst performance at relatively mild operating conditions.

Correlations for predicting key diesel fuel properties were developed and checked against actual laboratory blend data. The blending study was incorporated into an economic evaluation. Including a hydrocracker in a 5,300 metric ton per day Arge Fischer-Tropsch upgrading complex was shown to produce a much higher return on investment than a complex where the wax was blended with fuel oil.

Finally, it is possible to take advantage of the high quality of the Fischer-Tropsch derived distillate by blending a lower value light cycle oil (procured from a refinery FCC unit) representing a high aromatic and low cetane number. The blended stream meets diesel pool specifications (up to 60 wt-% LCO addition). The value added to this blending stream further enhances the upgrading complex return.