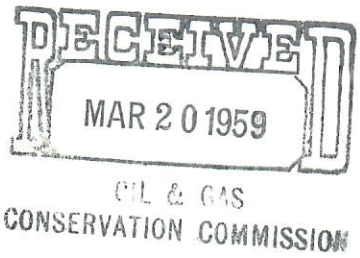
CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

February 19, 1959

REPLY TO
706 PATTERSON BLDG.
DENVER, COLORADO



Champlin Oil & Refining Company
2501 First National Bank Building
Denver, Colorado

Subject: Core Analysis
Landaker-Fastenau No. 5 Well
West Fork Field
Washington County, Colorado

Gentlemen:

"J" sand analyzed from 4956 to 4963 feet is interpreted to be oil productive. A water cut is considered possible. This seven-foot interval has an average permeability of 163 millidarcys and a total observed natural productive capacity of 1141 millidarcy-feet, considered ample to support satisfactory rates of injection or withdrawal. The average measured porosity is 21.2 per cent and the average measured total water saturation is 62.1 per cent of pore space. This relatively high average total water saturation is considered to be due to extreme flushing conditions resulting from slow coring rates. The connate water saturation for the interval has been estimated to be 35 per cent of pore space on the basis of single point capillary pressure data available for this field and an estimated correction factor, applied since a transitional zone is present below this interval. The average measured residual oil saturation is 14.5 per cent; however, the results of special water flooding tests made previously on formation from the Landaker-Fastenau No. 4 well indicate an average "unshrunk" residual oil saturation of 27.4 per cent of pore space and this value has been used when computing the water drive recovery estimate presented later.

Recoverable oil estimates have been calculated for the "J" sand interval, 4956 to 4963 feet, using observed and estimated core analysis data for the seven feet in the interval in conjunction with estimated reservoir fluid characteristics considered applicable. These estimates are

presented on page one of this report and are subject, in all respects, to the conditions outlined in the body of and in the footnotes to the summary page. These estimates have been calculated assuming production is started at original reservoir conditions and no adjustments have been made for prior production or for the various factors which tend to reduce the magnitude of economic oil recovery.

From 4963 to 4970 feet, analyzed "J" sand exhibits a slight change in residual fluid distribution and is interpreted to be in the transitional stage from oil to water productive. Therefore, it is expected that oil produced from this zone would be accompanied by a significant water cut. Since three and one-half feet of core were not recovered from the interval, 4951 to 4969 feet, the top of the transitional zone will be dependent upon the exact location of the lost-core interval.

Low residual oil saturations and high total water saturations indicate the "J" sand interval, 4970 to 4979 feet, to be water productive. Due to low permeability, the lower portion of this zone from 4976 to 4979 feet may be essentially nonproductive.

Formation was recovered from the Landaker-Fastenau No. 5 using diamond coring equipment and oil emulsion mud. Samples of recovered formation were selected for analysis by representatives of Champlin Oil & Refining Company and of Core Laboratories, Inc., as is indicated on the accompanying Completion Coregraph. The selected samples were sealed in plastic bags to preserve fluid content and were analyzed at the Sterling laboratory.

Thank you for the opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

J D Harris

J. D. Harris,
District Manager

JDH:JDJ:jw