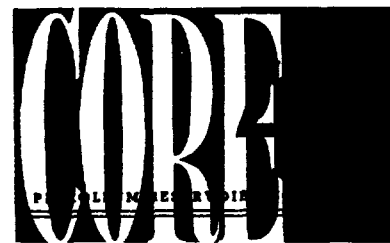CORE ANALYSIS REPORT

FOR

UNION OIL COMPANY OF CALIFORNIA

DUNCAN "B" NO. 1-6 WELL

SOUTH TATUM WOLFCAMP FIELD

LEA COUNTY, NEW MEXICO

LOCATION: SEC. 6-T13S-R36E

CORE

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

February 18, 1958

REPLY TO
P. O. BOX 36
MIDLAND, TEXAS

Union Oil Company of California
Box 6738
Roswell, New Mexico

Attention: Mr. D. A. Dunn

Subject: Core Analysis
Duncan "B" No. 1-6 Well
South Tatum Wolfcamp Field
Lea County, New Mexico
Location: Sec. 6-T13S-R36E

Gentlemen:

Diamond coring equipment and water base mud were used to core the intervals, 10,263 to 10,366 and 10,410 to 10,468 feet, in the Duncan "B" No. 1-6. Engineers of Core Laboratories, Inc. selected samples of recovered formation for analysis as directed by representatives of Union Oil Company of California. These samples were quick-frozen to preserve fluid content and were transported to the Hobbs laboratory where analysis was made by whole-core procedures using long segments of full-diameter core. Complete analysis results are presented in this report.

Wolfcamp formation at permeable points of analysis between the depths of 10,263 and 10,442 feet is characterized by residual fluid saturations which are considered to be favorable to oil production. The average permeability of the 13.9 permeable feet analyzed in this over-all 135-foot interval is 8.8 millidarcys, and the total observed natural productive capacity is 122 millidarcy-feet, indicating that a formation treatment will probably be necessary in order to establish sustained satisfactory rates of flow. The average measured porosity is 6.8 per cent, and the average calculated connate water saturation is 35.4 per cent of pore space.
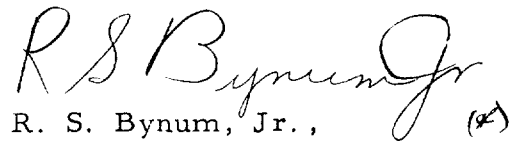
Because of the limited number of productive feet analyzed in the inter-
val, 10,263 to 10,442 feet, the cumulative production to be obtained
will probably be somewhat restricted.   To aid in the evaluation of this
zone, however, estimates of recoverable oil have been calculated using
the observed core analysis data in conjunction with estimated reservoir
fluid characteristics which are considered to be applicable to this hori-
zon.   These estimates are presented on page one of this report and are
subject to the conditions set forth in the body of and in the footnotes to
the summary page.

We sincerely appreciate this opportunity to be of service and trust that
this report will prove useful in making a preliminary evaluation of the
Wolfcamp formation analyzed from the Duncan "B" No. 1-6.

Very truly yours,

Core Laboratories, Inc.

R. S. Bynum, Jr.,
District Manager

RSB:JDJ:sw

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Wolfcamp   10,263.0-10,442.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	135.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		35.4
FEET OF CORE INCLUDED IN AVERAGES	13.9	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	35.4
AVERAGE PERMEABILITY: MILLIDARCYS Max.:	8.8	OIL GRAVITY: °API	(e)	43
90° :	4.1			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET Max.:	122	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e)	1500
90° :	57			
AVERAGE POROSITY: PER CENT	6.8	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.90
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	10.3	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		180

Calculated maximum solution gas drive recovery is 33   barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 125 barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL:

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE		
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API		
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is   barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated   (e) Estimated   (m) Measured   (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

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                                      Tyler, Texas

CORE ANALYSIS REPORT

FOR

UNION OIL COMPANY OF CALIFORNIA

ANDERSON NO. 1-7 WELL

TATUM WOLFCAMP FIELD

LEA COUNTY, NEW MEXICO

LOCATION: SEC. 7-T13S-R36E

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

May 5, 1958

REPLY TO
P. O. BOX 36
MIDLAND, TEXAS

Union Oil Company of California
Box 6738
Roswell, New Mexico

Attention: Mr. D. A. Dunn

Subject: Core Analysis
Anderson No. 1-7 Well
Tatum Wolfcamp Field
Lea County, New Mexico
Location: Sec. 7-T13S-R36E

Gentlemen:

Wolfcamp formation was cored in the subject well between 10,250 and
10,476 feet using diamond coring equipment and water base mud. Sam-
ples were selected from the interval, 10,303 to 10,361 feet, by an engi-
neer of Core Laboratories, Inc. as directed by a representative of Union
Oil Company of California. Remaining samples were selected for analysis
by a representative of the operator and all samples were quick-frozen to
preserve fluid content. The analysis was performed at the Hobbs labora-
tory by whole-core procedures using long segments of full-diameter core
and complete results are given in this report.

Analyzed portions of Wolfcamp formation from 10,263.0 to 10,357.5 feet
exhibit favorable residual fluid saturations and are considered to be cap-
able of oil production where permeability equals or exceeds 0.1 millidarcy.
The 23.0 permeable feet analyzed in this interval have an average per-
meability of 7.7 millidarcys and a total observed natural productive capa-
city of 176 millidarcy-feet, indicating that a formation treatment may be
necessary in order to establish satisfactory rates of flow. The average
measured porosity is 6.2 per cent and the average calculated connate
water saturation is 29.6 per cent of pore space.

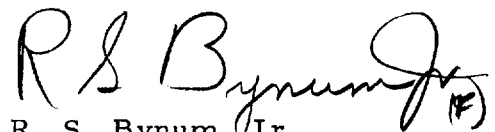To aid the evaluation of the Wolfcamp formation interval, 10,263.0 to

10,357.5 feet, estimates of recoverable oil have been calculated using the observed core analysis data in conjunction with estimated reservoir fluid characteristics considered applicable. These estimates are presented on page one of this report and are subject to the conditions set forth in the body of and in the footnotes to the summary page.

From 10,418 to 10,437 feet, Wolfcamp formation is characterized by somewhat higher total water saturations than the previously discussed interval and is interpreted to be predominantly water productive.

We sincerely appreciate this opportunity to be of service. We hope that this report will assist the preliminary evaluation of the Wolfcamp formation analyzed from the Anderson No. 1-7.

Very truly yours,

Core Laboratories, Inc.

R. S. Bynum, Jr.,
District Manager

RSB:JDJ:dw

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Wolfcamp 10,263.0-10,357.5

FEET OF CORE RECOVERED FROM ABOVE INTERVAL	94.5	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		29.6
FEET OF CORE INCLUDED IN AVERAGES	23.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	29.6
AVERAGE PERMEABILITY: MILLIDARCYS	Max.: 7.7 / 90° .: 5.6	OIL GRAVITY: °API	(e)	38
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.: 176 / 90° .: 129	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	(e)	1500
AVERAGE POROSITY: PER CENT	6.2	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	(e)	1.90
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE	6.5	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		178

Calculated maximum solution gas drive recovery is 33 barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is 147 barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL:

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE		
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API		
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated   (e) Estimated   (m) Measured   (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

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