

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. A. Shellshear
DISTRICT MANAGER
F. O. Mortlock
DISTRICT EXPLORATION
MANAGER
M. I. Taylor
DISTRICT PRODUCTION
MANAGER

P. O. Drawer 669
Roswell, New Mexico

October 6, 1960

BEFORE EXAMINER NUTTER	
OIL CONSERVATION COMMISSION	
<i>App</i>	EXHIBIT NO. <u>1</u>
<i>Case</i>	NO. <u>2181</u>

The Director
United States Geological Survey
Washington 25, D. C.

Application for Designation
of a Unit Area

Dear Sir:

Gulf Oil Corporation herewith makes application for the Designation of a Unit Area to be known as the Hackberry Hills Unit, consisting of the following described lands in Eddy County, New Mexico:

T-21-S, R-25-E, N.M.P.M.

Sec. 25: S/2
Sec. 26: S/2
Sec. 27: SE/4
Sec. 34: E/2
Sec. 35: All
Sec. 36: All

T-21-S, R-26-E, N.M.P.M.

Sec. 31: All
Sec. 32: W/2

T-22-S, R-25-E, N.M.P.M.

Sec. 1 : All
Sec. 2 : All
Sec. 3 : E/2 (irregular)
Sec. 11: NE/4
Sec. 12: N/2 and SE/4

T-22-S, R-26-E, N.M.P.M.

Sec. 5 : All (irregular)
Sec. 6 : All (irregular)
Sec. 7 : All (irregular)
Sec. 8 : All
Sec. 9 : W/2 and SE/4
Sec. 10: SW/4
Sec. 14: SW/4
Sec. 15: All
Sec. 16: All
Sec. 17: All
Sec. 18: NE/4
Sec. 21: N/2 and SE/4
Sec. 22: All
Sec. 23: All
Sec. 26: All
Sec. 27: N/2 and SE/4



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containing 13,920.38 acres, more or less, all as more fully delineated on the Land Ownership Map enclosed herewith.

The proposed Unit Area contains a total of 13,920.38 acres of which 7,841.50 acres are federal lands, 4,838.88 acres are state lands and 1,240.00 acres are fee lands. At the date of this writing there are unleased state and fee lands aggregating 840.00 acres. The unleased state acreage has been advertised for oil and gas lease at a public sale to be held on October 18, 1960. Negotiations are also underway to acquire oil and gas leases covering the unleased fee lands. All federal lands within the above description are covered by the following listed federal oil and gas leases:

- | | |
|------------------|------------------|
| (1) LC-064489-A | (12) LC-068793-A |
| (2) LC-064490 | (13) LC-069954 |
| (3) LC-064492 | (14) NM-0870-C |
| (4) LC-064528-A | (15) NM-02500 |
| (5) LC-064548-A | (16) NM-02500-A |
| (6) LC-065532 | (17) NM-025188 |
| (7) LC-067593 | (18) NM-029128 |
| (8) LC-067596 | (19) NM-034358 |
| (9) LC-067965 | (20) NM-047423 |
| (10) LC-068865 | (21) NM-077442 |
| (11) LC-068329-A | (22) NM-077460 |
| | (23) NM-0112134 |

The names of all oil and gas operators owning working interests in, and who will be invited to join the proposed Unit Area, together with their approximate percentages of acreage ownership are as follows:

<u>Operator</u>	<u>No. of Acres</u>	<u>Percentage</u>
Gulf Oil Corporation	6,080	43.68
Union Oil Company of California	880	6.32
Sunray Mid-Continent Oil Company	680	4.88
Phillips Petroleum Company	600	4.31
Pure Oil Company	600	4.31
The Ohio Oil Company	560	4.02
Skelly Oil Company	560	4.02
Honolulu Oil Corporation	480	3.45
Sun Oil Company	480	3.45
Northern Natural Gas Producing Company	440	3.16
The Superior Oil Company	400	2.87
Tidewater Oil Company, et al	360	2.59
Sinclair Oil & Gas Company	240	1.72
Tennessee Gas & Oil Company	160	1.15
H. C. Roberts	160	1.15
Carper Drilling Company, Inc.	120	.86
G. Conley	80	.57
E. A. Hansen	80	.57
Shell Oil Company	80	.57
Humble Oil & Refining Company	40	.29
Unleased	840	6.03

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Except for the usual provisions made for state and fee lands, Gulf proposes to use a standard form of Unit Agreement copied from 30 CFR 226.12, Amended in Section 11 (Participation After Recovery) to incorporate the suggested changes contained in the Regional Director's Notice to Proponents of Federal Unit Agreements dated September 8, 1960.

We are enclosing Gulf's Geologic Report in triplicate and a Land Ownership Map in quintuplicate. We request that the Geologic Report and discussions in connection therewith be considered confidential.

Federal Leases LC-064492, LC-064528-A, LC-064548-A, LC-067596 and LC-068793-A all have expiration dates within the next six months and we would appreciate your processing this application at your earliest convenience in order that we may begin drilling the test well at the earliest possible date.

Respectfully submitted,



W. A. Shellshear

WVK:hs

Enclosures

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. A. Shellshear
DISTRICT MANAGER
F. O. Mortlock
DISTRICT EXPLORATION
MANAGER
M. I. Taylor
DISTRICT PRODUCTION
MANAGER
G. A. Price
DISTRICT SERVICES MANAGER

October 4, 1960

P. O. Drawer 669
Roswell, New Mexico

CONFIDENTIAL GEOLOGICAL REPORT

PROPOSED HACKBERRY HILLS UNIT EDDY COUNTY, NEW MEXICO

THE DIRECTOR - UNITED STATES GEOLOGICAL SURVEY
WASHINGTON, D. C.

This is a proposed Federal-type Unit covering 13,920 acres to drill a 12,000 foot Devonian wildcat to be located in the northeast quarter of Section 2, Township 22 South, Range 25 East, Eddy County, New Mexico. The proposed Unit, as shown on Exhibit "A", is located on the northwest margin of the Delaware Basin, about three miles west-southwest of the city of Carlsbad, New Mexico. A seismograph interpretation, from profiles using both the conventional and "thumping" techniques, shows a large northwest-southeast trending structure approximately ten miles long and three miles wide in the Unit Area. The seismic interpretation which is shown on Exhibit "E" has approximately 650 feet of closure at the Devonian level. The Bone Spring level as shown on Exhibit "D" has approximately 200 feet of closure. The basis for the Unit boundary, as shown on the Devonian Seismograph Map, Exhibit "E", is the lowest closing contour (-8800) and a fault that bounds the anomaly on the south and west flanks which has a displacement of 120 to 280 feet.

The prospect is located in an area of relatively high topographic relief with the Yates and Tansill formations exposed at the surface. A dominant northwest-southeast trending topographic and structural feature, approximately twelve miles long and one and a half miles wide, as shown on Exhibit "C" parallels and is nearly coincident with the seismic structure. In general, the surface structures in this area are coincident with the topographic highs and appear to reflect Permian reefing; however, in view of the large size of this surface feature and the orientation (perpendicular) to the lineation of the reefing, we feel it reflects a structural ridge at depth.

The regional dip of the Devonian formation is east into the Delaware Basin at a rate of about 180 feet per mile. Subsurface control in the area is limited to five deep tests as shown on Exhibit "B". The Pan American No. 1 Guadalupe Foothills Unit well, a 13,034 foot Ellenburger failure approximately four miles southwest of the Unit, tested 7,650 feet of brackish water in the Devonian formation. In 1958, Phillips Petroleum Company re-entered this test unsuccessfully to test slight shows in the Pennsylvanian section. Approximately six miles southwest of the Unit, the Northern Natural Gas No. 1 McKittrick Hills Unit test was abandoned at a total depth of 11,890 feet after recovering 3,960 feet of

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salty sulphur water from the Devonian formation. This test flowed 800,000 cubic feet of gas per day from the Lower Pennsylvanian section. The Phillips Petroleum Company No. 1 Seven Rivers Hills Unit, a 10,663 foot Mississippian failure approximately five miles northwest, flowed a small amount of gas on two tests in the Pennsylvanian section. Approximately five miles north of the Unit, the John M. Kelly No. 1 Lake McMillan Unit test was abandoned at a total depth of 11,565 feet after recovering 8,950 feet of sulphur water from the Devonian formation. Only slight shows of gas were recovered on two tests in the Wolfcamp and Pennsylvanian sections. The Honolulu Oil Corporation has recently staked location for a 12,000 foot Devonian test approximately two miles south of the Unit Area on their No. 1 McKittrick Canyon Unit.

The proposed Hackberry Hills Unit test should penetrate about 200 feet of back-reef anhydrite, limestone and sandstone of the Tansill and Upper Yates formations before encountering the Capitan Reef section. The Capitan and Goat Seep dolomite reef sections with intermittent sandstone beds, are anticipated to be about 2,000 feet thick. Approximately 1,800 feet of basin type Delaware limestone, sandstone and shale should be present. The Bone Spring section should contain about 3,500 feet of limestone and sandstone with some shale. The Wolfcamp formation may vary from 400 to 600 feet in thickness; however, on a structurally high test, this limestone and shale section could be absent. The Pennsylvanian and Mississippian formations should contain about 3,000 to 3,300 feet of dolomite, limestone, sandstone and shale. In all, the test should penetrate between 10,900 and 11,400 feet of sediments to the top of the Devonian formation. The columnar section is shown as Exhibit "E".

The potential pay zones and expected depths are as follows:

Delaware sandstone	2,200 feet
Bone Spring limestone	4,000 feet
Pennsylvanian limestone	7,900 feet
Pennsylvanian sandstone	10,000 feet
Devonian dolomite	10,900 feet.

We found by experimentation that to obtain usable data in this area, it was necessary to follow the stream valleys and areas of recent fill. Considering the inherent difficulties of obtaining seismic information in this area of rugged relief, we feel the data are of relatively good quality. The seismic maps, together with the supporting surface feature indicates the probable existence of a deep structure of considerable magnitude.

Respectfully submitted,

C. A. Engwall
C. A. Engwall
District Regional Geologist

Attachments
CAE:dd