

GEOLOGICAL REPORT
OF
PROPOSED WEST AIRPORT UNIT
EDDY COUNTY, NEW MEXICO

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 4
CASE NO. 5332

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CATCLAW UNIT

T. Brown
Huckberry
Main Unit
TD 11144

Gulf,etal
Huckberry
Hills Unit

Hanagon
No. Carlsbad

Ohio
Tracy
TD 5805

Superior

Bluebird
Happy Valley
TD 1278

CARLSBAD

Gulf
Huckberry
TD 10054

Pure
Fed.
TD 10724

R-26-E

Gulf
Drive

W.P.R.
Fed.
TD 2965
Tex. Oil
City of Carlsbad

Covina
S.A.F. Fed

Pan Amer
McK. Hrick Gas Unit

WEST AIRPORT UNIT

PROPOSED
LOCATION

Sinton
Huckberry
TD 11551

Pennzoil
Moore

C. Grace
Gopogo

Jenkins-Mc
Vorbis
TD 2255
Gopogo

C. Grace
City of Carlsbad
TD 11970

FIELD

Gulf
Spencer

Midwest
Fed

Midwest
New Mex

CARLSBAD
AIRPORT

Midwest
New Mex

Grandonoco

C. Grace
Humble-Grace

C. Grace
Parrish

U.S. Smeit
Collatt
TD 2065

CARLSBAD

Superior
Collatt

Hanagon Art
(Sheep Draw) Mary Fed

Squaw

Everest-M
Ramus
TD 808

Roundey
Roundey
TD 1917

Hamon
S.A. Fed

Int
Ritted

Texas Oil
Pan Am

Pennzoil
12. Moon Fed

Echols

SOUTH

WEST AIRPORT UNIT
Eddy County, New Mexico
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CATCLAW UNIT

CARLSBAD

WEST AIRPORT UNIT

PROPOSED LOCATION

CARLSBAD AIRPORT

FIELD

CARLSBAD

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INDEX PLAT

GEOLOGICAL REPORT
OF
PROPOSED WEST AIRPORT UNIT
EDDY COUNTY, NEW MEXICO

I. Purpose

This report is written for the purpose of briefly summarizing the geological reasons for forming a six-section Federal unit to drill a 12,000' Morrow wildcat test in Section 28, T-22-S, R-26-E, Eddy County, New Mexico.

II. Location

The proposed West Airport Unit is located three miles southwest of the city of Carlsbad and one mile west of the Carlsbad Municipal Airport. The tentative drill site, located in the northwest-quarter of Section 28, will not endanger private or commercial aircraft utilizing the airport. Estimated ground level elevation is 3350'.

The proposed unit area contains six sections, or 3840 acres, and includes all of Sections 20, 21, 28, 29, 32, and 33, T-22-S, R-26-E, Eddy County, New Mexico. The terrain consists of a low relief, semi-arid surface over the south and southeast portion of the unit grading into the rougher topography of the Hackberry Hills to the north. The unit area is easily accessible by a paved road that extends southwest from Carlsbad through the unit and on to Dark Canyon.

III. Geology - Morrow Formation

A. General Discussion

The West Airport Unit is located on the northwest flank of the Delaware Basin. Approximately 14,000' of Permian, Pennsylvanian, Mississippian, Silurian, and Ordovician sediments are present, with the proposed test well projected to a total depth of 12,000' in the Mississippian Barnett shale.

The primary objective is the Lower Pennsylvanian Morrow sands while good secondary objectives exist through potential porous carbonate development in the Wolfcamp, Canyon, and Strawn sections.

Productive trends and permeability barriers in the Morrow sand section are usually parallel to the depositional and structural strike in this area of Southeast New Mexico.

B. Stratigraphy (See Cross Sections)

The primary objective of the West Airport Prospect is the gas producing sands of the Middle Morrow Unit (M₃) and especially the main gas sand of the South Carlsbad Field. Two cross sections, A-A' and B-B', have been prepared using the top of the Morrow as a datum which illustrate the stratigraphy, permeability barriers, and fluid entrapment in the sands. The productive sands of the South Carlsbad Field are limited on the west side by a north-north-east to south-southwest trending permeability barrier supported by a series of Morrow dry holes. As indicated on cross section A-A', the Pennzoil No. 1 Moore-Com. (No. 3) test, located in Section 23, condemned all the Morrow sands as impermeable either by drill stem

*proposed
depth 12000
which should
penetrate
Barnett
shale*

testing or electric log calculations. However, the Grace No. 2 Gopogo (No. 4) producer, located beyond the barrier to the east in the South Carlsbad Field, potentialled for 54 MMCFGPD from the main South Carlsbad pay sand and tested gas and/or water from several other zones.

Updip to the west from the non-productive Pennzoil test, the Sinclair No. 4 Hackberry Hills test (No. 2) stopped drilling in the Lower Strawn section and was completed in a Canyon carbonate zone through perforations 10,060' to 10,090'. Since the Superior No. 1-Q State Com. producer, located three miles to the north in Section 34, T-21-S, R-26-E, is considered on depositional strike, the Morrow portion of the electric log was projected into the Sinclair well on the cross section. The Superior test was perforated in several porous, permeable sands, including the South Carlsbad sand, and flowed 1,350,000 CFGPD and no water on production test.

In the Honolulu No. 1 McKittrick Canyon Unit (No. 1), also updip to the west, the potentially productive Morrow sands of the proposed unit area were wet, tight, or shaled out. Therefore, a second barrier is indicated in the position depicted on the cross section and structural map.

Cross section B-B' exhibits the same stratigraphic processes as section A-A'. The key well on this section showing the previously mentioned permeability barrier between the South Carlsbad Field and the West Airport Unit is the Midwest No. 1-Y dry hole located in Section 35. This well flowed an estimated 310,000 CFGPD on a drill

stem test; however, when it was perforated opposite the South Carlsbad Field pay and other sands above and below, it failed to establish commercial production even after acid and fracturing. To the east, the Antweil No. 1 Allen producer, located just off the plat in Section 31, T-22-S, R-27-E, of the South Carlsbad Field, potentialed for 3.468 MMCFGPD from the main sand.

West of the permeability barrier, the Midwest No. 1-L Federal producer (No. 3) was perforated opposite several sands in the Middle Morrow Unit (M₃) in addition to the South Carlsbad zone. After a 4500-gallon acid treatment, the well flowed up to 3 MMCFGPD before the pipe collapsed and various other mechanical problems occurred. A temperature survey indicated that most of the gas flow was from perforations at 11,416' and 11,475' opposite the main South Carlsbad sand with a lesser amount coming from perforations at 11,360'. After considerable remedial work, the latest reported flow test was 1,100,000 CFGPD through a 22/64" choke with 610# flowing tubing pressure. This well probably sustained extensive formation damage during workover; however, it is significant that no formation water has been produced.

The producing sands in the Midwest No. 1-L Federal are wet, tight, or shaled out updip to the southwest in the Hanagan producers in Sections 11 and 12, T-23-S, R-25-E. This substantiates the existence of a permeability barrier in the position indicated on the cross section and structural map separating the potentially productive Middle Morrow sands (M₃) of the West Airport Unit from their non-productive updip equivalents.

C. Structure

As indicated on the contoured structural map, a productive trend exists updip and parallel to the permeability barrier that limits gas production on the west flank of the South Carlsbad Field. The productive trend is then bounded on the west by another permeability barrier which establishes the West Airport Unit's updip productive limits.

Strong structural nosing from the west extending eastward into the South Carlsbad area then establishes the productive limits of this prospect along strike to the north and south. The structural map has been contoured on the Middle Morrow Unit (M₃) since it best represents current structural conditions of the entire Morrow section.

IV. Secondary Objectives (Refer to Section A-A')

The Wolfcamp produces in the Pennzoil No. 1 Moore-Com. well (No. 3) in Section 23. Although the occurrence of the Wolfcamp carbonate zones are erratic, they are considered a potential pay in the unit area.

The Canyon produces in the Sinclair No. 4 Hackberry Hills (No. 2) in Section 22 and in the Texas International Petroleum No. 1 Allied State two miles southeast of the unit in Section 10, T-23-S, R-26-E. Canyon carbonate deposition is also erratic, but the unit area is considered potentially productive.

Although biogenic banks or mounds are not anticipated in the Strawn in this area, localized porosity development in existing

units is anticipated. Generally, if porosity is present, it is gas productive; therefore, the Strawn is considered a good pay possibility.

V. Summary

A. The West Airport Unit is primarily a Middle Morrow Sand (M₃) gas prospect.

B. The unit is located on productive trend parallel to the South Carlsbad Morrow Sand Gas Field but separated from it on the west flank by a pronounced permeability barrier that is well defined by dry holes.

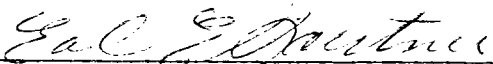
The key well of the prospect is the Midwest No. 1-L Federal gas well offsetting the southeast corner of the prospect in Section 34. This well produces gas and no reported water from all porous sands in the Middle Morrow Unit (M₃), whereas the equivalent sands in the updip wells to the west are wet, tight, or shaly, thereby establishing another barrier just west of the unit.

C. A strong structural nose across the unit delineates the boundaries of the prospect along strike.

D. Good secondary possibilities exist in the area for potential development of porous, gas productive, carbonate zones in the Wolfcamp, Canyon, and Strawn.

VI. Conclusion

Geologically, there is strong justification for the formation of the six-section West Airport Unit as proposed.



Earl E. Gaertner
Geologist

DRAFT

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 5332

Order No. R- 4883

APPLICATION OF C & K PETROLEUM, INC.,
FOR APPROVAL OF THE WEST AIRPORT
UNIT AGREEMENT, EDDY, COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on
October 3, 1994, at Santa Fe, New Mexico, before Examiner
Daniel S. Nutter.

NOW, on this day of October, 1994, the Commission,
a quorum being present, having considered the testimony, the record,
and the recommendations of the Examiner, and being fully advised
in the premises,

FINDS:

(1) That due public notice having been given as required by
law, the Commission has jurisdiction of this cause and the subject
matter thereof.

(2) That the applicant, C & K Petroleum, Inc.,
seeks approval of the West Airport Unit Agreement
covering 3840 acres, more or less, of State,
Federal lands
and Fee
described as follows:

Eddy COUNTY, NEW MEXICO
TOWNSHIP 22 South, RANGE 26 East, NMPM

Secs. 20 and 21: All

Secs. 28 and 29: All

Secs. 32 and 33: All

(3) That approval of the proposed unit agreement should promote the prevention of waste and the protection of correlative rights within the unit area.

IT IS THEREFORE ORDERED:

(1) That the West Airport Unit Agreement is hereby approved.

(2) That the plan contained in said unit agreement for the development and operation of the unit area is hereby approved in principle as a proper conservation measure; provided, however, that notwithstanding any of the provisions contained in said unit agreement, this approval shall not be considered as waiving or relinquishing, in any manner, any right, duty, or obligation which is now, or may hereafter be, vested in the Commission to supervise and control operations for the exploration and development of any lands committed to the unit and production of oil or gas therefrom.

(3) That the unit operator shall file with the Commission an executed original or executed counterpart of the unit agreement within 30 days after the effective date thereof; that in the event of subsequent joinder by any party or expansion or contraction of the unit area, the unit operator shall file with the Commission within 30 days thereafter counterparts of the unit agreement reflecting the subscription of those interests having joined or ratified.

(4) That this order shall become effective upon the approval of said unit agreement by the Commissioner of Public Lands for the State of New Mexico and the Director of the United States Geological Survey; that this order shall terminate ipso facto upon the termination of said unit agreement; and that the last unit operator shall notify the Commission immediately in writing of such termination.

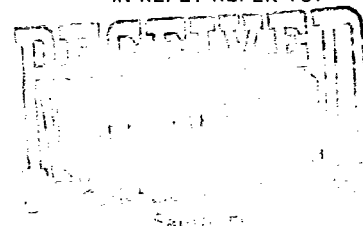
(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225

IN REPLY REFER TO:



SEP 24 1974

Mr. Randolph M. Richardson
P.O. Box 819
Roswell, New Mexico 88201

Dear Mr. Richardson:

Your application of August 30, 1974, filed in behalf of C&K Petroleum, Inc., with the Area Oil and Gas Supervisor, Roswell, New Mexico, requests the designation of the West Airport unit area embracing 3,840.00 acres, more or less, Eddy County, New Mexico, as logically subject to exploration and development under the unitization provisions of the Mineral Leasing Act, as amended.

Pursuant to the unit plan regulations of December 22, 1950, 30 CFR 226.3, the land requested, as described on your plat marked "Exhibit A, West Airport Unit, Eddy County, New Mexico," is hereby designated as a logical unit area.

The unit agreement submitted for the area designated should provide for the drilling of the initial exploratory well to test all beds of the Pennsylvanian Age, or to a depth of 12,000 feet. Use of the Standard Federal Form of Unit Agreement for Unproved Areas (1968 reprint) will be acceptable with the addition of the words "as amended" inserted after (30 F.R. 12314) in Section 26, Nondiscrimination, and the necessary provisions covering the inclusion of State and fee lands.

In the absence of any type of land requiring special provisions or any objection not now apparent, a duly executed agreement identical to said form will be approved if submitted in approvable status within a reasonable time.

However, the right is reserved to deny approval of any executed agreement which, in our opinion, does not have commitment of sufficient land to afford effective control of operations within the unit area.

When the agreement is transmitted to the Oil and Gas Supervisor for approval, include the latest status of all acreage. The format of the sample exhibits attached to the Standard Federal Form of Unit Agreement for Unproved Areas should be followed closely in the preparation of Exhibits A and B.

Inasmuch as this unit agreement involves State land, we are sending a copy of the letter to the Commissioner of Public Lands in Santa Fe. Please contact the State of New Mexico before soliciting joinders, regardless of prior contacts with or clearances from the State.

Sincerely yours,

Conservation Manager, Central Region
For the Director

cc:

Com. Pub. Lands, Santa Fe

NMOCC, Santa Fe

Roswell (2)

Cons. Div. Reading File

ARStall:ds



OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

I. R. TRUJILLO
CHAIRMAN

**LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER**

**STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR**

October 22, 1974

Mr. Randolph Richardson
Attorney at Law
Post Office Box 819
Roswell, New Mexico 88201

Re: CASE NO. 5332
ORDER NO. R-4883
Applicant:
C & K Petroleum, Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

H. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC	<u>x</u>
Artesia OCC	<u>x</u>
Aztec OCC	

Other Unit Division - State Land Office

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NO. 5332
Order No. R-4883

APPLICATION OF C & K PETROLEUM, INC.
FOR APPROVAL OF THE WEST AIRPORT
UNIT AGREEMENT, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on October 2, 1974,
at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 22nd day of October, 1974, the Commission,
a quorum being present, having considered the testimony, the
record, and the recommendations of the Examiner, and being
fully advised in the premises,

FINDS:

(1) That due public notice having been given as required
by law, the Commission has jurisdiction of this cause and the
subject matter thereof.

(2) That the applicant, C & K Petroleum, Inc., seeks
approval of the West Airport Unit Agreement covering 3840
acres, more or less, of State, Federal and Fee lands described
as follows:

EDDY COUNTY, NEW MEXICO
TOWNSHIP 22 SOUTH, RANGE 26 EAST, NMPM
Sections 20 and 21: All
Sections 28 and 29: All
Sections 32 and 33: All

(3) That approval of the proposed unit agreement should
promote the prevention of waste and the protection of correlative
rights within the unit area.

IT IS THEREFORE ORDERED:

(1) That the West Airport Unit Agreement is hereby approved.

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that notwithstanding any of the provisions contained in said unit

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CASE NO. 5332
Order No. R-4883

agreement, this approval shall not be considered as waiving or relinquishing, in any manner, any right, duty, or obligation which is now, or may hereafter be, vested in the Commission to supervise and control operations for the exploration and development of any lands committed to the unit and production of oil or gas therefrom.

(3) That the unit operator shall file with the Commission an executed original or executed counterpart of the unit agreement within 30 days after the effective date thereof; that in the event of subsequent joinder by any party or expansion or contraction of the unit area, the unit operator shall file with the Commission within 30 days thereafter counterparts of the unit agreement reflecting the subscription of those interests having joined or ratified.

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(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

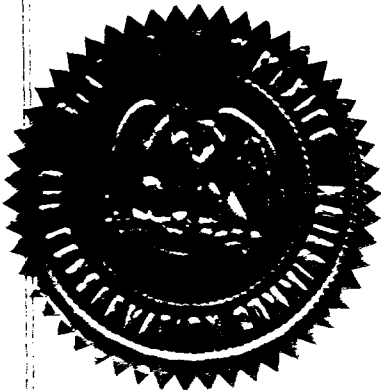
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member

A. L. PORTER, Jr., Member & Secretary



S E A L

jr/