

LAW OFFICES
JOHN E. COCHRAN, JR.
CARPER BUILDING
ARTESIA, NEW MEXICO

Mr. R. R. Spurrier, Secretary
Oil Conservation Commission of New Mexico
State Capitol Building
Santa Fe, New Mexico

11-264

Dear Mr. Spurrier:

Enclosed herewith, in triplicate, is Application of Kewanee Oil Company for Approval of Unit Agreement for the Development and Operation of the Four Mile Unit Area in Chaves County, New Mexico, attached to which is proposed form of Unit Agreement to be entered into between the interested parties.

It is my understanding that hearing on this Application has been set for March 20, 1951.

Very truly yours



John E. Cochran, Jr.

JEC:rm
Encls.

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RECEIVED
MAR 20 1951

BEFORE THE COMMISSIONER OF PUBLIC
LANDS OF THE STATE OF NEW MEXICO

APPLICATION OF KEWANEE OIL COMPANY FOR APPROVAL OF
UNIT AGREEMENT FOR THE DEVELOPMENT AND OPERATION OF
THE FOUR MILE UNIT AREA, CHAVES COUNTY, NEW MEXICO

Comes KEWANEE OIL COMPANY, a Corporation, with an office at Roswell, New Mexico, and files herewith copy of proposed Unit Agreement for the development and operation of the Four Mile Unit Area in Chaves County, New Mexico, and respectfully requests that said Unit Agreement be approved, and in support thereof, shows:

1. That the Unit Area comprises 14,238.96 acres, situated in Townships 18 and 19 South, Range 18 East, N.M.P.M., as will more particularly appear by the plat attached to the copy of the proposed Unit Agreement, filed herewith, as Exhibit "A", and by reference made a part hereof. That of the lands embraced in the proposed Unit Area, 8,078.60 acres are Federal lands, 5,760.36 acres are State lands, and 400 acres are Fee lands. The location of the lands of the State of New Mexico, which are included within the Unit Area, is set out in particular detail and by distinctive markings on said plat, attached to the proposed Unit Agreement.

2. That the lands embraced in the Unit Area were designated by the Acting Director of the United States Geological Survey on February 19, 1951, as logical for inclusion in a unit plan of operation, and that there is filed herewith copy of geological report and structural map, which are to be treated as confidential, as provided by the

regulations of the Commissioner of Public Lands. That it is believed that all of the lands situated in the Unit Area are located upon the same geological structure and said Unit Agreement, if approved, will give effective control of all, or substantially all, of the geological structure or feature involved.

3. That said Unit Agreement has been approved as to form by the Acting Director of the United States Geological Survey and complies with the regulations of the Secretary of the Interior relative to unit agreements, but contains appropriate provisions for joint control by the Secretary of the Interior and the Commissioner of Public Lands in substantially the same form as unit agreements heretofore approved by the Commissioner of Public Lands, the Secretary of the Interior and the New Mexico Oil Conservation Commission. Said proposed Agreement is made subject to the approval of the Commissioner of Public Lands, the Secretary of the Interior and to the approval of the New Mexico Oil Conservation Commission, after hearing, as provided by law.

4. That Kewanee Oil Company, Applicant herein, is designated as Unit Operator under the terms of said Agreement, and as such Operator, will have the right to carry on exploration and development work in accordance with the terms of said Unit Agreement. The Applicant, as Unit Operator, proposes to commence, within six (6) months from the effective date of the Unit Agreement, a test well for oil and gas upon some part of the lands embraced in the Unit Area, selected by the Unit Operator, and to drill said well in accordance with the terms of said Unit Agreement to

a depth sufficient to test the Ellenburger formation, or until at a lesser depth unitized substances shall have been discovered which can be produced in paying quantities, but that as Unit Operator, Applicant shall not be required to drill said well in excess of a depth of 5500 feet.

5. That Applicant believes, in the event oil or gas in paying quantities is discovered in said test well or by reason of any subsequent development carried on pursuant to the terms of said Unit Agreement, that said Agreement will tend to promote the conservation of oil and gas and the better utilization of reservoir energy.

6. That under the terms of the proposed Unit Agreement, the State of New Mexico will receive its fair share of the recoverable oil and gas in place under its lands embraced in the Unit Area.

7. That the respective institutions of the State of New Mexico having lands within the Unit Area, or which may later be included therein, in accordance with the provisions of said Unit Agreement, will participate in rentals due as to said lands, in accordance with the terms of oil and gas leases covering said respective tracts, and will also participate in royalties in the proportion that their acreage bears to the total acreage included in the participating area from time to time, under the Unit Agreement.

8. That said Unit Agreement is believed to be in all respects for the best interest of the State of New Mexico, with respect to the lands of the State of New Mexico embraced in said Unit Area.

9. That Applicant is committing to said Unit Agreement its leases issued by the Commissioner of Public

Lands of the State of New Mexico, covering the following lands:

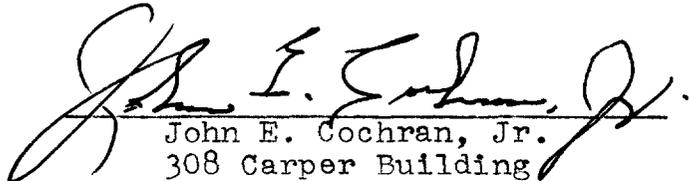
<u>TWP.</u>	<u>RGE. N.M.P.M.</u>	<u>SECTION</u>
18 S	18 E	13; NE/4, S/2, SW/4 NW/4 23; All 24; N/2, SW/4 25; W/2 26; E/2, NW/4, NW/4 SW/4 34; W/2, SE/4, S/2 NE/4, NE/4 NE/4 35; SW/4, S/2 NW/4, NE/4 36; W/2
19 S	18 E	2; All 24; W/2 SE/4, N/2 NE/4 25; W/2 E/2

and that said Agreement is satisfactory to Applicant. All of the other parties owning State oil and gas leases embracing lands within the Unit Area will be afforded an opportunity to join in said Unit Agreement.

10. That a petition has been filed for approval of said Unit Agreement with the New Mexico Oil Conservation Commission and that upon approval thereof by order of the Oil Conservation Commission, executed copies of said Agreement will be submitted for approval by the Commissioner of Public Lands and by the Secretary of the Interior or his duly authorized representative.

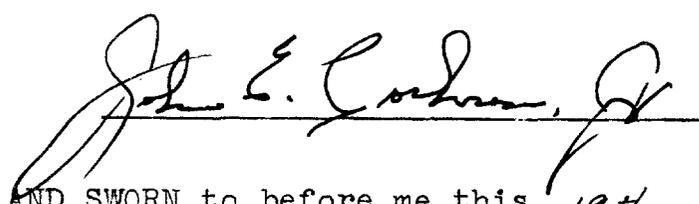
11. That the Commissioner of Public Lands of the State of New Mexico has heretofore, on February 28, 1951, granted tentative approval of said Unit Agreement, in substantially the same form as herewith submitted and at the time such tentative approval was granted, Applicant paid to the Commissioner of Public Lands the sum of \$115.00 to cover filing fee, being at the rate of \$5.00 for each section or fraction thereof of the lands embraced in the proposed Unit

Area, as provided by the rules and regulations of the Commissioner of Public Lands.


John E. Cochran, Jr.
308 Carper Building
Artesia, New Mexico
Attorney for Applicant
Kewanee Oil Company

STATE OF NEW MEXICO)
 : ss.
COUNTY OF EDDY)

JOHN E. COCHRAN, JR., being first duly sworn upon his oath, deposes and states: That he is attorney for the Applicant in the above and foregoing Application and that he has read the same and from personal knowledge knows the matters therein contained to be true and correct, except such statements as are alleged upon information and belief and as to those, he verily believes them to be true; that this verification is made by him on behalf of KEWANEE OIL COMPANY because a representative or agent of Kewanee Oil Company is not available to sign this Application.



SUBSCRIBED AND SWORN to before me this 19th day of March, 1951.


Ruth Marshall
Notary Public

My commission expires:

April 15, 1954

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

APPLICATION OF KEWANEE OIL COMPANY
FOR APPROVAL OF UNIT AGREEMENT FOR
THE DEVELOPMENT AND OPERATION OF
THE FOUR MILE UNIT AREA IN CHAVES
COUNTY, NEW MEXICO

NO. _____

Applicant, KEWANEE OIL COMPANY, is a Delaware Corporation licensed to transact business in the State of New Mexico and has an office in Roswell, New Mexico, and files herewith three copies of a proposed Unit Agreement for the development and operation of the Four Mile Unit Area in Chaves County, New Mexico, and respectfully requests that said Unit Agreement be approved, and in support thereof shows:

1. That the unit area comprises 14,238.96 acres situated in Townships 18 and 19 South, Range 18 East, N.M. P.M., as will more particularly appear by the map attached to the copy of the proposed unit agreement filed herewith, as Exhibit "A", and by reference made a part hereof. That of the lands embraced in the proposed unit area, 8,078.60 acres are Federal lands, 5,760.36 acres are State Lands and 400 acres are Fee lands. The location of the lands of the State of New Mexico which are included within the unit area is set out in particular detail and by distinctive markings on said plat attached to the proposed unit agreement.

2. That the lands embraced in the unit area were designated by the Acting Director of the United States Geological Survey on February 19, 1951, as logical for inclusion in a unit plan of operation and all of the lands situated in the unit area are believed to be located upon

the same geological structure.

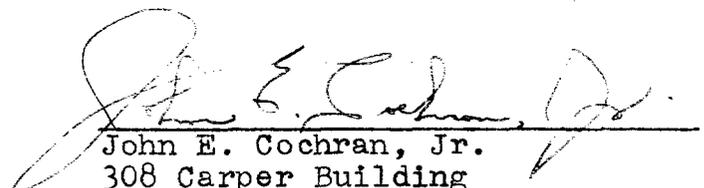
3. That said unit agreement, as to form, has been submitted to the Director of the United States Geological Survey for preliminary approval, and complies with the regulations of the Secretary of the Interior relative to unit agreement, but contains appropriate provisions for joint control between the Secretary of the Interior and the Commissioner of Public Lands, and is in substantially the same form as unit agreement heretofore given preliminary approval by the Commissioner of Public Lands. Said proposed agreement is made subject to the approval of the Commissioner of Public Lands, the Secretary of the Interior and to the approval of the New Mexico Oil Conservation Commission, after hearing, as provided by law.

4. That the undersigned applicant is designated as Unit Operator under the terms of said unit agreement and as such Unit Operator will have the right to carry on exploration and development work in accordance with the terms of said unit agreement. That applicant, as Unit Operator, proposes to commence, within six (6) months from the effective date of the unit agreement, a test well for oil and gas upon some part of the lands embraced in the unit area selected by the Unit Operator, and to drill said well in accordance with the terms of said unit agreement to a depth sufficient to test the Ellenburger formation, or until at a lesser depth unitized substances shall have been discovered which can be produced in paying quantities, but that as Unit Operator, Applicant shall not be required to drill said well in excess of a depth of 5500 feet.

5. That it is believed that operations to be carried on under the terms of said unit agreement will promote the economic and efficient recovery of oil and gas to the end that the maximum yield may be obtained from the field or area, if oil or gas should be discovered in paying quantities and it is further believed that such agreement will be in the interest of conservation of oil and gas and the prevention of waste as contemplated by the Oil Conservation Statutes of the State of New Mexico.

6. That upon an order being entered by the New Mexico Oil Conservation Commission approving said Unit Agreement and after approval thereof by the Commissioner of Public Lands of the State of New Mexico and the Secretary of the Interior of the United States, or his duly authorized representative, an approved copy of said agreement will be filed with the Oil Conservation Commission of New Mexico.

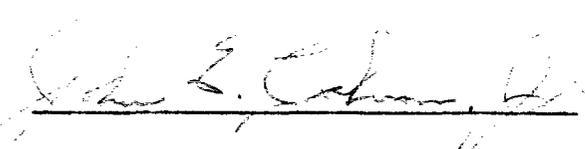
WHEREFORE, Kewanee Oil Company, Applicant herein, respectfully requests that a public hearing be held on the matter of the approval of said Unit Agreement, as provided by the Statutes of the State of New Mexico and the regulations of the Oil Conservation Commission of New Mexico, and that upon said hearing said Unit Agreement be approved by the Oil Conservation Commission of New Mexico.



John E. Cochran, Jr.
308 Carper Building
Artesia, New Mexico
Attorney for Applicant,
Kewanee Oil Company

STATE OF NEW MEXICO)
 : ss.
COUNTY OF EDDY)

JOHN E. COCHRAN, JR., being first duly sworn upon his oath, deposes and states: That he is attorney for the Applicant in the above and foregoing Application and that he has read the same and from personal knowledge knows the matters therein contained to be true and correct, except such statements as are alleged upon information and belief and as to those, he verily believes them to be true; that this verification is made by him on behalf of KEWANEE OIL COMPANY because a representative or agent of Kewanee Oil Company is not available to sign this Application.



SUBSCRIBED AND SWORN to before me this 15th day of February, 1951.



Notary Public

My commission expires:
April 15, 1954

KEWANEE OIL COMPANY
LAND AND GEOLOGICAL DEPARTMENT
P. O. Box 239
ROSWELL, NEW MEXICO

February 21, 1951

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Oil Conservation Commission
Santa Fe, New Mexico

Case 364

Re: Proposed Unit Area, Chaves County,
New Mexico

Gentlemen:

The Kewanee Oil Company submits this application for the designation of a Unit Area in Southwest Chaves County, New Mexico. It is suggested that the unit title should be "Four Mile Unit", so named to be identified with Four Mile Canyon, the most prominent topographic feature of the region.

The following described land is considered necessary and adequate to cover the structural and stratigraphic conditions discussed in "Exhibit A". "Exhibit A" being a geologic report and surface maps of the Prospect, also a map and schedule showing extent and nature of ownership within the proposed unit.

New Mexico Principal Meridian
Township 18 South, Range 18 East
Sec. 1, Lots 7, 8, 9 & 10; and $S\frac{1}{2}$
Sec. 11, $SE\frac{1}{4}$ Sec. 24, $N\frac{1}{2}$, $SW\frac{1}{4}$
Sec. 12, All Sec. 25, $W\frac{1}{2}$
Sec. 13, All Sec. 26, All
Sec. 14, All Sec. 27, All
Sec. 15, $SE\frac{1}{4}$ Sec. 28, $E\frac{1}{2}$
Sec. 21, $SE\frac{1}{4}$ Sec. 34, All
Sec. 22, All Sec. 35, All
Sec. 23, All Sec. 36, $W\frac{1}{2}$

Township 19 South, Range 18 East
Sec. 1, Lots 3 & 4; $S\frac{1}{2}NW\frac{1}{4}$; $SW\frac{1}{4}$
Sec. 2, Lots 1, 2, 3 & 4; $S\frac{1}{2}N\frac{1}{2}$; $S\frac{1}{2}$
Sec. 3, Lots 1, 2, 3 & 4; $S\frac{1}{2}N\frac{1}{2}$; $S\frac{1}{2}$
Sec. 10, All
Sec. 11, All
Sec. 12, $W\frac{1}{2}$; $S\frac{1}{2}SE\frac{1}{4}$
Sec. 13, All
Sec. 14, All
Sec. 15, $N\frac{1}{2}NE\frac{1}{4}$
Sec. 23, $NE\frac{1}{4}$
Sec. 24, All
Sec. 25, All

Total Acreage - 14,238.96

Page 2 - Oil Conservation Commission

A map of the proposed unit is included and is marked in distinctive colors to differentiate State, Federal and privately-owned lands.

A test well of this Area should be drilled until fluid in the Ellenburger formation is reached. There are no remaining objective horizons below this formation. The regional dips established on the Ellenburger formation and basement rocks, as determined by cross sections and regional subsurface maps, would recommend a 4650 ft. test or a 5500 ft. maximum.

Copies of the enclosed exhibits have also been forwarded to The Director of the United States Geological Survey, Washington, D. C., for approval of the Unit Area.

The Kewanee Oil Company requests that the geologic report be treated as strictly confidential.

Very truly yours,

KEWANEE OIL COMPANY

By

Jack R. Huffmyer

Encls.

KEWANEE OIL COMPANY

FOUR MILE UNIT

CHAVES COUNTY, NEW MEXICO

GEOLOGICAL REPORT

PROSPECTIVE AREA

CHAVES COUNTY, NEW MEXICO

SUMMARY AND CONCLUSIONS

The area considered in this report demonstrates the necessary qualifications to encourage prospecting. These qualifications are outlined below and describe in detail in the body of the report.

- I. Known surface structural features believed to have closure or displacement with depth.
- II. Stratigraphic section indicates source beds and favorable reservoir conditions. Formations present are productive on the North and East sides of the Delaware Basin.
- III. Preliminary survey indicates availability of large acreage tracts at minimum cost.
- IV. Major companies are already represented in the area and future development can be expected.
- V. The comparative cost of drilling a well to a depth of 5000 to 5500 feet would adequately evaluate the prospect and is not considered prohibitive.

LOCATION

The area discussed in this report embraces a six-township block (Townships 18 and 19 South, Ranges 18 and 19 East), Chaves County, New Mexico. This is approximately 40 miles southwest of the city of Artesia, New Mexico.

HISTORY OF DEVELOPMENT

This area is enclosed by several large surface structural features, only two of which have been tested (Dunken Dome and Black Hills Anticline.)

The Texas Company completed its No. 1 Wilson-State with cable tools on the large surface anticline known as Dunken Dome (November 19, 1927,) located 310 feet from South line and 315 feet from the West line of Section 29, Twp. 17 S., Rge. 18 E. The well was abandoned at total depth of 4900', after having penetrated a complete sedimentary section from San Andres through Mississippian. Only 10 feet of Fusselman (Silurian) had been drilled when abandoned. A hole full of brackish water was encountered at total depth.

The other test in this area is the Magnolia No. 1 Black Hills Unit, located 660 feet from North line and 1980 feet from East line of Section 31, Twp. 17 S., Rge. 20 E., Chaves County. Drilled on the Black Hills Surface Anticline, this well was plugged at a total depth of 6085 feet in pre-Cambrian, after having penetrated a complete sedimentary section including 940 feet of porous dolomites of Fusselman (Silurian), and Ellenburger and Montoya (Ordovician) age. Shows of oil were found at 1650 feet. Several efforts to complete drill stem test in this zone failed because of equipment failures. A drill stem

Several conspicuous milky chert beds are found through this deposit.

A basal Ordovician or Cambrian sand, commonly recognized as the Bliss Sandstone of Cambrian age, appears uniformly over this area. This sand is very coarse, well sorted, rounded and frosted.

PRE-CAMBRIAN

The basement in this area is sometimes pink granite, however many wells drill through 50 to 300 feet of a green metamorphic material, commonly described as a chlorite schist.

STRUCTURE

The subject area is located at the apex of a right angle intersection of two large structural units, recognizable from surface deformation. The Y-O overthrust anticline is a marked feature of surface displacement and slight overthrust, that can be traced from the southwest quarter of Township 18 South, Range 18 East, northeastward to Township 14 South, Range 22 East, where the fault is concealed by alluvium of the Pecos Valley.

The Huapache Monocline is a predominant feature that parallels the Guadalupe Mountain front and certainly represents a line of folding or faulting that resulted from the uplift of the Guadalupe Mountains. The rate of dip change from 3° to 12° has been measured. Insufficient evidence is available to positively state that this fault and monocline trend are deep-seated features; however, published reports of the Guadalupe Mountain front show considerable block and step faulting along the escarpment and East of the Guadalupe Range.

It is my opinion that these evidences of faulting exist in the subsurface from the Guadalupe Mountains front to the Huapache Monocline trend, but do not cut the surface beds in the Huapache Monocline and Y-O Fault areas because of the positions of these features North and East of the lines of maximum stress. They could also be shallow compression features that resulted from the uplift of the Sacramento and Guadalupe Mountains. However, there is no definite data to support either reasoning. Considerable evidence is present to suspect that the maximum uplift on the pre-Cambrian in this area occurs between the Guadalupe Mountain front and the Huapache Monocline with a resulting 90° change in the direction of regional dip. (See contoured map).

Further evidence of strong structural influence in this area is shown by the change in strike of two large surface anticlines. Dunkan Dome, West of the Y-O Fault trace strikes approximately $N 10^{\circ} W$, whereas the Black Hills Anticline, East of the Y-O fault, strikes approximately $N 60^{\circ} E$. The reversal in strike of these large surface anticlines is also indicated by subsurface contours on the top of the pre-Cambrian.

If we can assume that displacement or folding occurs with depth along the Huapache Monocline and the Y-O Fault zone, then a favorable fault or antidiapal trap could be expected in the subject area near the junction of these features, and the greatest sub-sea datum on top of the Silurian and Ellenburger members could be anticipated in this area.

RESERVOIR ROCKS

The only important reservoir rocks in this area would be Mississippian or older.

The San Andres is exposed at the surface and is flooded with fresh water in low lying porous areas.

The Yogo formation has shown slight staining in some intervals, however the thinbedded nature of these dolomites with evaporites and silty sandstones do not present a favorable objective.

The Pennsylvanian System in this area contains too much red shales and coarse shaly elastic material to provide favorable reservoirs.

The Mississippian System may have objective horizons in the form of small bioherm reefs. Several small structures of this type are exposed in outcrops on the west scarp of the Sacramento Mountains.

The Fusselman Formation (Silurian) and Montoya and Ellenburger formations (Ordovician) would be the most favorable objective horizons. A test of this area would penetrate as much as 900 feet of massive dolomitic limestone with porosity ranging from pinpoints to cavernous solution channels. The nearest Devonian and Silurian oil production is in the Ohsum pool, east of Roswell, 70 miles northeast of the subject area. The Montoya and Ellenburger also produce oil and gas in several fields on the Central Basin Platform.

The formation fluids recovered from drill stem tests of the Fusselman and Ellenburger formations in wells north of the Hespache Monocline and east of the Y-O Fault are salt water and salty-sulphur water.

These same formations have carried brackish water and fresh water in the two wells that have been drilled south and west of these regional features. Namely, Texas No. 1 Wilson-State (Dunken Dome Test), and the Pure No. 1 Hunter, northwest Culbertson County, Texas.

It is believed that this change in formation water characteristics would be strong evidence that deep-seated faulting was present between wells where marked change in water salinity occurs.

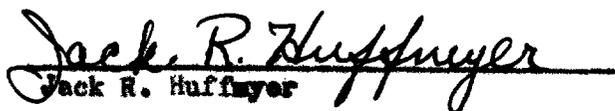
DEPTH OF TEST WELL

A proper test of this Prospect should include the porous interval at the top of the Ellenburger formation as observed in the sample logs of the Magnolia No. 1 Black Hills Unit and the Standard Oil Company of Texas No. 1 Blaise (Scarp Unit) wells. Water found in this horizon would adequately condemn the location.

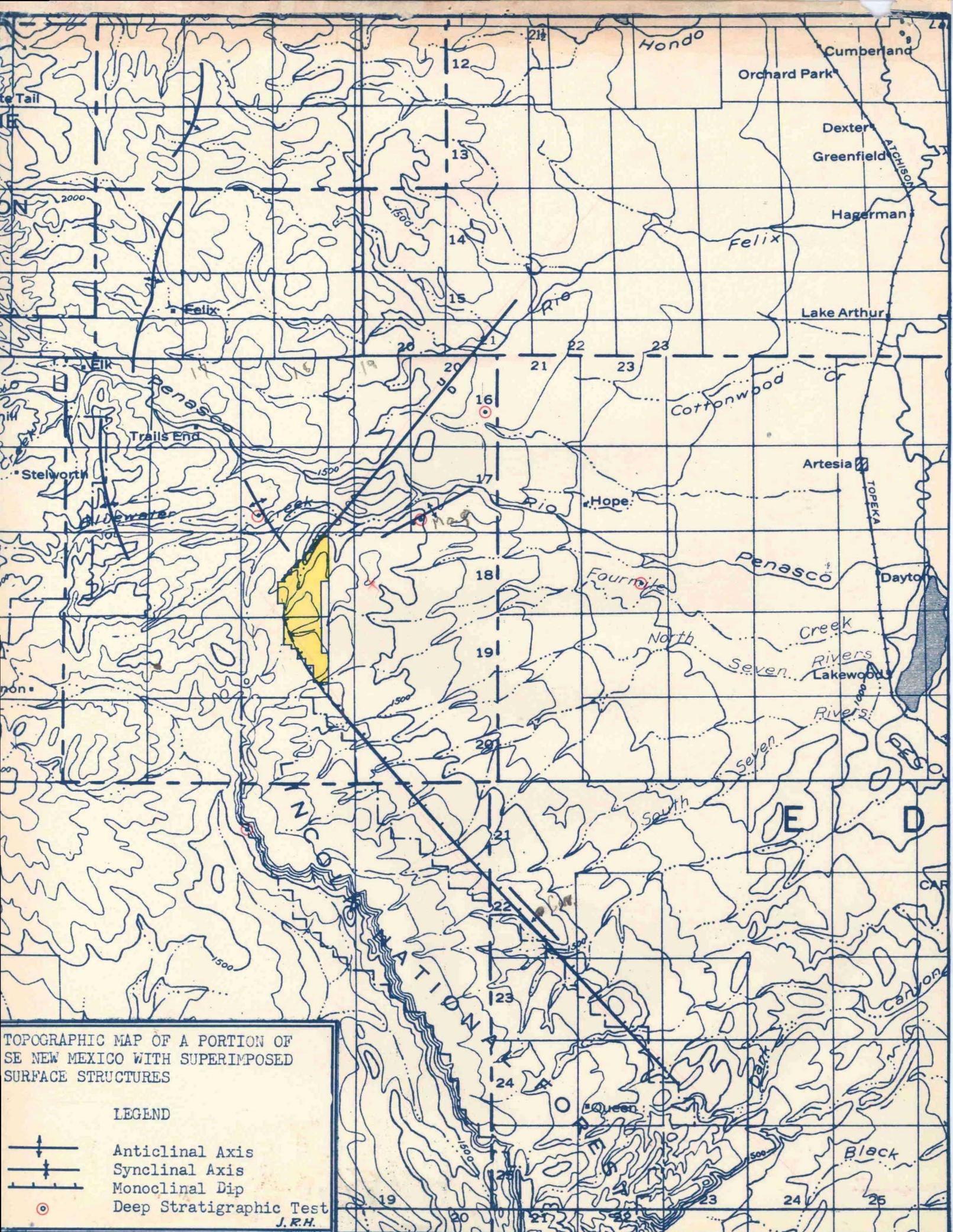
The topographic position of this Prospect, surface dip and the rate of dip of the Fusselman formation as established by the cross sections, included with this report, indicate that the Ellenburger porosity could be expected at or above 4650 feet.

An estimated total depth of 5500 feet would be more than adequate to reach this objective.

Respectfully submitted,

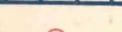

Jack R. Huffmeyer

LARGE FORMAT
EXHIBIT HAS
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AND IS LOCATED
IN THE NEXT FILE



TOPOGRAPHIC MAP OF A PORTION OF SE NEW MEXICO WITH SUPERIMPOSED SURFACE STRUCTURES

LEGEND

-  Anticlinal Axis
-  Synclinal Axis
-  Monoclinical Dip
-  Deep Stratigraphic Test

J.R.H.

LARGE FORMAT
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AND IS LOCATED
IN THE NEXT FILE