

GEOLOGY OF PROPOSED INDIAN HILLS FEDERAL UNIT

Introduction

The proposed Indian Mills Unit is located fifteen miles west of the city of Carlsbad, Eddy County, New Mexico. The unit lies in the western part of the Seven Rivers Hills in Township 21 South and Range 24 East and is just east of the Indian Basin area. Rocky Arroyo Canyon crosses the Seven Rivers Mills through the proposed unit.

Stratigraphy

The surface rocks at the proposed location, located 660' FS&WL of Section 21, T 21 S, R 24 E, are Queen in age. The nearest deep subsurface control is four miles west in the Ralph Lowe No. 1 Indian Basin which penetrated a reef type lithology in the San Andres, basinal Leonard and Wolfcamp sections, shelf edge carbonates in the upper Pennsylvanian, and detrital clastics and limestones in the lower Pennsylvanian. The anticipated geologic section in the proposed unit test well and their prospective pay zones are exhibited on the following table:

BUREAU EXAMINER NUTTER	
U.S. CONSERVATION COMMISSION	
APPL. EXAM. NO.	4
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# STRATIGRAPHIC TABLE

AGE	FORMATION	DEPTH	THICKNESS	LITHOLOGY	PROSPECTS
<u>Permian</u>	Queen	0-125'	125' /	Dol., Ss., & Anhy.	None
	Grayburg	125	575	Dol., Ss., & Anhy.	Very Poor
	San Andres	700	1400	Dol., Ls., Anhy., & Chert	Poor
	Glorieta	2100	100	Ss., Dol., & Anhy.	Fair-Oil
	Yeso	2200	700	Dol., Ls., Anhy., Cht., & sh.	Very Poor
	Bone Spring	2900	3100	Ls., Ss., Sh., & Dol.	Fair-Gas
	Wolfcamp	6000	1350	Sh., Dol., Ss., & Ls.	Fair-Gas
<u>Pennsylvanian</u>	Cisco-Canyon	7350	700	Dol., Ls., Ss., & Sh.	Excellent-Gas
	Strawn	8050	550	Ls., Sh., Ss., & Cht.	Poor
	Atoka	8600	350	Ls., Sh., Ss., & Cht.	Good-Gas
	Morrow	8950	500	Ss., Ls., & Sh.	Excellent-Gas
<u>Mississippian</u>	Barnett	9450	200	Sh. & Ss.	Poor
	Miss. Limestone	9650	400	Ls., Cht., & Sh.	Very Poor
	Woodford	10050	50	Sh.	None
<u>Silurian</u>	"Devonian"	10100		Ls. & Dol.	Good-Oil or Gas

Total Depth: 10,200'

Estimated Elevation: 3690'

### Structure

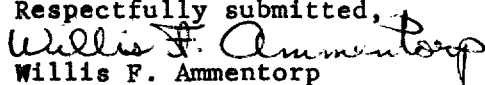
No Mappable surface structure is believed present in the area of discussion. The nearest obvious surface expression of underlying structure is approximately sixteen miles southwest along the Muapache monocline.

Sparse shallow well control in the area suggests a gentle nosing to the northeast on top of the San Andres formation. This is believed due to reef buildup within the San Andres, rather than reflection of deep structure. Deep structural configuration can only be hypothesized by geophysical methods; the structure upon which the proposed unit is based was delineated by seismic survey.

### Geophysics

The seismic work utilized in the proposed unit area was shot by Marathon Oil Company (formerly Ohio). A reflection seismograph survey was completed using the conventional split spread method, shooting up to six hole patterns. The data obtained is poor to fair quality and the interpretation of structure at the Siluro-Devonian level should be reasonably reliable. The survey interpretation is tied to one point of subsurface control to the west and a regional velocity gradient has been applied.

The seismic interpretation of structure on top of the Siluro-Devonian rocks shows a general north-south trending anticline with approximately 400 feet of closure. The -6600 foot datum on the enclosed Siluro-Devonian map is the closing contour. No faulting can be defined in the immediate area.

Respectfully submitted,  
  
Willis F. Ammentorp  
Geologist for Ralph Lowe

State of New Mexico

Commissioner of Public Lands

E. S. JOHNNY WALKER  
COMMISSIONER



January 1, 1941

Mr. Clarence E. Hinkle  
Harvey, Dow & Hinkle  
P. O. Box 10  
Roswell, New Mexico

Re: Proposed Indian Hills  
Agreement, 1941, Roswell, New  
Mexico.

Dear Mr. Hinkle:

This letter is to verify our telephone conversation  
of this date, in which we verbally approved as to form  
and content the Proposed Indian Hills Agreement.

Very truly yours,

E. S. JOHNNY WALKER  
COMMISSIONER OF PUBLIC LANDS

*Maian M. Rhee*  
BY:

(Mr. Maian M. Rhee, Supervisor  
of Public Lands)

ESW/mmrc/e

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BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

*App* EXHIBIT NO. *6*  
CASE NO. *2748*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY  
WASHINGTON 25, D. C.

JAN 15 1963

Barney, Ed. J.  
P.O. Box 10  
Kearney, Nebraska

Attention: Mr. Clarence E. Hinkle

Gentlemen:

Your application, dated January 7, 1961, filed with the Regional Oil and Gas Conservation Commission, for Ralph Lowe, Midland, Texas, requesting a unit agreement for 1,430 acres, more or less, in Eddy County, New Mexico, is hereby subject to exploration and development under the unit provisions of the Mineral Leasing Act, as amended.

Pursuant to the State Regulations of December 22, 1960, 30 CFR 121.10 (b) (2) (iii), the lands requested, as outlined on your land map, "Proposed Indian Hills Unit", are hereby designated as a unit well area.

Any unit agreement for the area designated should require a well to be drilled to Devonian age, or to a depth of 10,500 feet. The language of the standard form of unit agreement should be used, with the following language required for State of New Mexico:

1. The following section of the 1961 reprint should be replaced by the following new section:

In connection with the performance of this unit agreement, the operator agrees to comply with all of the provisions of section 301 (1) to (5) of Executive Order 10925 (26 F.R. 1977), which are hereby incorporated by reference in this agreement.

2. Change Item 6 (b) Beginning on line 5, page 7 of the 1961 reprint, to read as follows:

"The selection shall have been filed with the appropriate authority. If no successor unit operator is selected as herein provided, the Director at his discretion may declare this unit agreement terminated."

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BEFORE EXAMINER NUTTER	
OIL CONSERVATION COMMISSION	
EXHIBIT NO. 5	2748
CASE NO.	

If conditions are such that further modification of said standard form is necessary, three copies of the form so modified, with all changes clearly marked and with explanations and justification, must be submitted through the Oil and Gas Supervisor for perusal and approval of the Director. However, if some simple change is deemed essential, three copies thereof in lieu of the standard form may be so submitted.

In the case of any type of land requiring special provisions, or of any other case where it is apparent, a duly executed agreement identical with the one specified as outlined above, will be approved if submitted to the Supervisor within a reasonable period of time. However, it is to be noted that the right is reserved to deny approval of any agreement submitted which, in our opinion, does not provide for sufficient lands to afford effective control of said lands.

When the agreement is transmitted to the Supervisor for approval, the status of all acreage. In preparation of exhibits, please use the format of the sample exhibits attached to the back of the standard form.

Inasmuch as the State of New Mexico lands, we are sending a copy of this letter to the Commissioner of Public Lands at Santa Fe, New Mexico, and ask you to contact said Commissioner promptly in connection with this letter before soliciting joinders.

Sincerely yours,

*William M. Baker*

Acting Director

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