October 1, 1964

GEOLOGICAL MEMORANDUM TO ACCOMPANY
SUPPORTING MAPS FOR THE
BOGLE FLATS UNIT
TWP. 22 S., RGE. 23 E.
Eddy County, New Mexico

The accompanying maps cover the area of the Indian Basin Gas Field and the proposed Bogle Flats Unit. They are a structure map on the Cisco-Canyon massive Carbonate (limestone or dolomite, depending on the facies) and an isopach of the dolomite facies that is the primary producing formation in this field.

The dolomite facies represents a shelf edge reef (?) that grades westward into dense shelf type limestones and eastward into dense, thin, dark limestones and shales of basin type sediments. The gas is accumulated in the porous, fractured dolomite and is prevented from escaping updip (to the west) by a permeability barrier formed in the transition from dolomite to the limestone facies. Several wells have penetrated this limestone facies structurally higher than producing wells in the field, but found it lacked sufficient porosity and permeability to be productive. Good examples are the Odessa No. 1 Standard Federal, Section 8, Twp. 21 S., Rge. 23 E., and the Atlantic No. 1 AX, Section 32, Twp. 20 S., Rge. 24 E. An exception is the Williamson No. 1 Standard Federal, Section 19, Twp. 21 S., Rge. 23 E., which did potential 21 MMCFGPD open flow from the limestone facies. The porosity in this well is primarily due to fracturing which may provide communications with the main portion of the field.

A tongue of the dolomite facies that trends from the Indian Basin Field to the southwest is controlled by data found in the Sun No. 1 Weaver, Section 6, Twp. 22 S., Rge. 23 E., and the Humble Huapache wells in Twp. 23 S., Rge. 22 E. The Ralph Lowe No. 1 Marathon Federal well in Section 28, Twp. 22 S., Rge. 23 E., penetrated a 400 foot section of Cisco-Canyon, but this zone was limestone (slightly dolomitic) and shale and non-productive. It is comparable to the equivalent section encountered in the Ralph Lowe No. 1 Staple well in Section 22, Twp. 21 S., Rge. 24 E., which defines the Indian Basin Gas Field on the northeast.

An accurate water level is difficult to establish in the field. Referring to the Top Carbonate Structure Map, water is produced below approximately -3900 feet. Gas and water can be produced together from -3900 to approximately -3700 feet or -3750 feet with the gas to water ratio increasing at the shallower elevations, then water free gas is produced above -3700 to -3750 feet. All the acreage included in the subject unit occurs above the -3700 foot contour.

A structural nose trending to the southwest from the field is mapped on the Cisco-Canyon Carbonate. This nose overlies the thickest portion of the dolomite facies in the Bogle Flats Area. As mentioned previously, wells encountering the limestone facies at elevations higher than -3700 feet have been non-productive due to lack of an adequate reservoir rock; therefore, since the

acreage included in the Unit is structurally higher, the shape of the Unit is controlled by the presence or absence of dolomite rather than structural position. The Unit as outlined will cover the most favorable stratigraphy at the optimum structural elevations.

The well to be drilled on the Unit is programmed to penetrate through the Cisco-Canyon dolomite facies, which is the primary producing horizon in the Indian Basin Field. The Atoka-Morrow sands are also found gas productive in the field, but commercial production is limited to those wells located along the north margin of the field. The productive sands in these wells are typical of the Atoka-Morrow, that is they are extremely erratic in occurrence and correlative sands cannot be found in adjacent wells. In general, they occur as lenticular or bar type sands and not blanket sands. In the Indian Basin Field the sands lose porosity and permeability to the south and the wells nearest the proposed Bogle Flats Unit found these zones very tight and non-productive or very limited in their capacity to produce. For example, the following is a list of wells located adjacent to the Unit that penetrated the Atoka-Morrow sands and results obtained from tests taken in these formations.

Ralph Lowe No. 1-C Indian Basin Unit, Sec. 26-21S-23E - Tight

John Trigg IB-1, Sec. 6-22S-24E - Tight

Atlantic No. 2 Walt Canyon Unit, Sec. 4-22S-24E - Tight

Sun No. 1 Weaver, Sec. 6-22S-23E - COF 102 MCFGPD

Monsanto No. 1 Lowe State, Sec. 36-21S-23E - Not completed to date but all tests are unfavorable.

Due to the unpredictable occurrence and lack of reservoir characteristics of these sands, the risk involved in attempting to establish commercial production are too high to economically justify drilling the Bogle Flats Unit well to these deeper strata. In the future should additional data warrant the exploitation of these zones, wells could be drilled to develop any reserves that underlie the Unit.

It is anticipated that subsurface formations will be encountered by the Bogle Flats Unit well at the approximate elevations as follows:

San Andres	+3600'
Wolfcamp	-2200'
Cisco-Canyon	-3300'
Base of Cisco-Canyon Carbonate	-3700'

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