A REPORT

ON

THE BITTER LAKE UNIT AREA

CHAVES COUNTY, NEW MEXICO

BY

JOHN M. KELLY

CONSULTING GEOLOGIST

ROSWELL, NEW MEXICO

JANUARY 31,1946

THE BITTER LAKE UNIT AREA

CHAVES COUNTY, NEW MEXICO

Scope of Report:

The purpose of this report is to describe the structural conditions found in the above mentioned unit area, to be accompanied by a map showing the details of structure as found by magnetometic surveys.

Discovery:

The anticline, which is embraced in the Bitter Lake Unit Area, was discovered by the magnetometer, on a reconnaissance survey conducted by M. Whelan of Artesia, New Mexico. After the reconnaissance discovery the structure was thoroughly mapped in detail, the work consuming several weeks time during 1945.

Location:

The Bitter Lake Unit Area is located in central Chaves County, New Mexico. Approximately eight miles east of Roswell, in Township 10 South, Ranges 25 and 26 East, N.M.P.M.

Topography:

The chief physiographic feature of the area is the irregular bluff that borders the Pecos River on the east and rises 200 to 300 feet above the former flood plain.

The Bitter Lakes Unit Area borders the Pecos River on the east and is, for the greater part, on the top of this bluff. The altitude of the flood area on the Pecos is about 3500 feet rising to 3750 feet on top of the bluff.

A graded main highway from Roswell to Tatum borders the structure on the south and all supplies and equipment can be transported to the area by means of this highway. Two ranch roads running north and south traverse the Unit Area and these roads are serviceable in any weather.

Stratigraphy:

Chalk Bluff Formation

The outcropping rocks are of Permian origin and have been classified by Lang as belonging to the Chalk Bluffs formation. This formation consists of redbeds, salt, gypsum, and anhydrite, it is approximately 1000 feet thick as is shown by the log of the New State Petroleum Company's well in Section 27, T-10-S., R-26-E.

Chupadera Formation:

San Andres Limestone Member is from 1200 to 1300 feet thick and is composed almost entirely of limestone, dolomitic limestone and dolomite. The upper part of the formation is largely thin bedded and light gray in color. Much of it is dolomitic and large parts of both the limestone and dolomitic limestone are argillaceous and very fine grained. The lower part consists of dark gray, thick bedded, massive limestone much of which is coarse grained.

The Gloriette Sandstone member is immediately below the San Andres and is the dividing formation between it and the Yeso formation below. This bed is between about 50 and 100 feet thick and consists of cream colored sandstone, with coarse white quartz grains.

Yeso Formation:

The Yeso formation, consisting largely of gypsum and red beds with interbedded shale and sands, is approximately 1200 feet in thickness.

Abo Formation:

Below the Yeso is the Abo formation, consisting of red sands, arkosic material, red shales, and some interbedded limestone, it is approximately 1000 feet thick.

Hueco Formation:

This formation consists of gray granular and medium crystalline gray limestones, in part cherty. In the DeKalb Unit #1 Section 35, T-10-S, R-28-E crinoidal fragments are abundant, fulsulinds are present. This section is approximately 300 feet in thickness and is the basal Permian member.

Pre-Permian Formation:

Immediately underlying the Hueco is the Magdelena of the Pennsylvanian period and estimated to be 500 feet thick. This formation consists of dark petroliferous limestones and several interbedded sands. Below the Pennsylvanian it is estimated that there is 300 to 400 feet of Pecha formation, of Devonian age. This formation consists of chert and silicious limestones and dolomite.

The Richfield Coll #1 Section 18, T-11-S, R-27-E. drilled through the Devonian and encountered igneous material at a depth of 6613 feet.

The above described section at the Bitter Lake Unit Area shows a total of 8000 feet to be drilled to thoroughly test the petroleum possibibities of the sedimentary section which lies above the igneous formation, encountered in Richfield's Coll #1 and due to regional dip, will be encountered at a lesser depth on the Bitter Lake Unit Area.

Structure:

The structure is that of an anticline, located north and west of a fissure fault in Township 10 South, Ranges 25 and 26 East. The fault, is no doubt, a small displacement in line with the V-O fault; a prominent feature extending several miles in a northeasterly direction from Township 17 South, Range 19 East. The Shaffer well, drilled in Section 30, T-10-S, R-26-E, encountered considerable salt water in the Glorietta Sandstone, 2045 feet while the New State well, in Section 27, T-10-S, R-26-E, and only 3½ miles east of the Shaffer Well, was said not to have encountered any water in the Glorietta Sandstone at 2128 feet. Presumingly there is a fault between the wells, which seals off the salt water encountered in the Shaffer Well. The magnetometer work in the area bears out this contention.

The anticlinal axis of the structure extends from Section 25, T-10-S, R-25-E to Section 12, T-10-S, R-25-E. The apex of the anticline appears to be located between Sections 12 and 13, T-10-S, R-25-E.

The structural dips are rather regular, with a flattening to the northeast. The extent of structural closure is not determinable, but correlative magnetometer readings to a zero gamma datum plane shows that the minimum magnetic closure is over plus 75 gamma points; or from plus 100 gammas datum to plus 179 gammas datum.

The study of the attached map contoured on magnetic readings gives a much better conception of the structure.

Conclusions

The Bitter Lake Unit Area, being a structural feature, in the Permian sedimentary basin, mapped on magnetic surveys, is deserving of a test for its oil and gas possibilities.

Commercial production may be encountered in one or several zones in the Permian, Pennsylvanian or Devonian formations. These formations are at present producing in Southeastern New Mexico or West Texas. However, a well should be drilled to the igneous formation which should be encountered at a depth of 6000 feet or less, to adequately test these zones.

Respectfully submitted,

John W. Kelly
Consulting Geologist