

Buckles and Hostetler

OIL PRODUCTION CONSULTANTS

BOX 925

Monahans, Texas

June 4, 1956

Mr. Barney Cockburn
P. O. Box 105
Artesia, New Mexico

Dear Mr. Cockburn:

It is our understanding that you are contemplating the instigation of a water flood development in the Queen sand producing zone on your Wyatt-Phillips and Federal leases in Lea County, New Mexico. You requested a preliminary opinion as to the general flooding possibilities and a general outline as to our recommendation for procedure.

The leases are located in Sections 33 and 34, Twp. 17S., Rge. 33E. The information furnished us was a plat showing the locations of the wells and the depths at which the Queen sand occurs. Also you furnished production figures by wells from drilling date through April 1956.

The wells currently producing from the Queen sand are Wyatt-Phillips 1, 4, 6, 7 and 11; Federal wells 1, 2, 4, 5, 6, 7 and 8. The remaining wells U. S. Minerals 1 and 2; Wyatt-Phillips 5, 8, 9, 10 and 12 and Federal 3 all logged the Queen sand and could be converted to Queen sand injection or producing wells.

This production occurs in a steeply dipping structure toward the south and southeast. The wells along the north and northwest carried only gas in the Queen sand. These are U. S. Minerals 1 and 2 and Wyatt-Phillips 5, 8 and 12.

The production from the Queen wells is as follows:

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Arthur EXHIBIT No. *E*
CASE *1092*

| <u>Well</u> | <u>First Production</u> | <u>April 1956 Barrels</u> | <u>Accumulated Barrels Through April 1956</u> |
|-------------|-----------------------------|-------------------------------|---|
| Fed. 1 | Jan. 1951 | 594 | 61,824 |
| Fed. 2 | April 1951 | 390 | 53,648 |
| Fed. 4 | Oct. 1953 | 1200 | 34,607 |
| Fed. 5 | Jan. 1954 | 240 | 16,101 |
| Fed. 6 | May 1955 | 900 | 10,159 |
| Fed. 7 | Mar. 1956 | 594 | 1,230 |
| Fed. 8 | Mar. 1956 | 186 | 1,217 |
| W-P 1 | Feb. 1951 | 189 | 40,239 |
| W-P 4 | Dec. 1952 | 313 | 28,209 |
| W-P 6-11 | Feb. 1954 | 1199 | 18,893 |
| W-P 7 | Apr. 1954 | 658 | 18,545 |

The above production history indicates sufficient sand thickness, porosity and permeability to enable this formation to respond readily to a water flood development. The Queen sand is being successfully flooded in other parts of the Permian Basin. It is responding to flood operation in the Keystone Colby and Weiner Colby fields in Winkler County, Texas and in the Clara Couch field in Crockett County, Texas.

Since there is a definite gas cap in the Queen sand in this field we would recommend injecting water into the gas cap first to block this zone off and preventing oil being migrated into it. This procedure has been very successful in other fields having a gas cap. In general it results in forcing the gas down dip into the oil zone where it comingles with the oil, lowering its viscosity and increasing the gravity. No loss is evident in this procedure as would be the case if oil were migrated into the gas zone. Wells then such as Wyatt-Phillips 5, 8 and 9 could be opened into the Queen zone and water injection started as soon as possible.

Later on we would recommend the flood put on as much of an enclosed pattern as possible. This could be accomplished when evidence of production increase is first noticed in the first line of wells down dip from the injection wells.

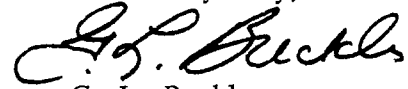
An additional procedure could be instigated at once to evaluate the flood performance in the oil zone. Federal well #8 is centrally located in the oil bearing zone and this would be a good well to be used as a test injection well. It is offset in three directions by Queen zone producing wells. As soon as definite results are accomplished a regular flood pattern could be established.

It is our understanding an excellent water supply is available and tests are being conducted in the laboratory now. Preliminary analyses show the water to be very low in mineral content with a turbidity of zero and a Ph of 7.4. This water would not even have to be filtered and the only treatment indicated is a bactericide.

Results from flooding the Queen sand in the Permian Basin on a regular 5-spot pattern indicate that flooding will recover from 1 1/2 to two times primary production after primary is produced to economic limit.

The only hazard in flood performance on this property would be possibly fractured formation indicated by the steep dip toward the south and south-east. This possible condition might tend to by-pass the oil containing pore spaces. If this condition exists, these fractures could be successfully plugged in our opinion, and normal flooding operations resumed.

Yours very truly,


G. L. Buckles

GLB:ph