MEMBERS OF THE CAPROCK FIELD OPERATORS COMMITTEE:

The following is a brief outline of the progress that has been made to date toward a unitized or cooperative agreement for the Caprock Field in order to facilitate the commencement of a secondary oil recovery program:

On September 19th at the New Mexico Oil & Gas Engineering Committee office in Hobbs a meeting of the Caprock Field Engineering Committee was held with the following representatives and companies present:

J. D. Duncan - Delfern Oil Company - Lubbock, Texas
Ralph C. DeWoody - Delfern Oil Company - Lubbock, Texas
John R. Brack - Ohio Oil Company - Midland, Texas
Merrill B. Wilson - Great Western Prod. Inc. - Lubbock,Tex.
O. H. Crews - Great Western Prod. Inc. - Lubbock, Texas
H. E. Massey - Cities Service Oil Co. - Hobbs, New Mexico
A. D. Pickett - Phillips Petro. Co. - Box 1605 - Hobbs,N.M.
Wesley W. Moore - British-American - Box 2649 - Tulsa, Okla.
Joseph D. Kennedy - J. C. Maxwell, Inc. and Crandall & Osmund - 2006 Cont. Life Bldg. - Fort Worth, Texas
Fred Norris - British-American - Box 352 - Seymour, Texas
Sam Williams - Sam Williams - Artesia, N. M.
Lonnie Kemper - Vickers Petro. Corp. - Box 744 - Roswell,N.M.
R. B. Moore - Lea Co. Elect. Coop.,Inc. - Lovington, N.M.
Lyle L. Donovan - Lea Co. Elect. Coop.,Inc. - Lovington,N.M.
George Hirschfeld - N. Mex. Oil & Gas Engr. Comm. - Hobbs,N.M.
M. C. Forsman - A. K. Polis Oil Co. - McAllen, Texas
B. Cockburn - Watson Drlg. Co. - Artesia, N.M.
A. K. Polis - A. K. Polis - Box 959 - Edinburg, Texas
Paul Hollaway - Coop. Prod. Assn. - Caprock, N.M.
Eldow Clapham - Gulf Oil Corp. - Box 1667, Hobbs, N.M.
D. L. Irion - Mid-Cont. Pet. Corp. - Box 734 - Hobbs, N.M.
Robert D. Fitting - Coop. Prod. Assn. - 202 West Bldg. Midland, Texas (Temporary Chairman)

The meeting was for the primary purpose of discussing from an engineering viewpoint the next steps to be taken in order to effect a fieldwide secondary oil recovery program and prepare recommendations

for a participation formula.

Mr. Morse of the R.E.A., cocperative electric company, gave a few brief remarks about possibility of obtaining three-phase electrical current for the Caprock Field. His company would be interested in connecting the field with their system in Artesia; however, in order to assure installation pay out, they require a five-year contract and approximately one year to complete the system. The offered rate scale was graduated in accordance with load and reasonable, considering the high installation cost of 30 miles of transmission lines. In view of the uncertain need, it appeared to be the general consensus of opinion that additional work must be done before definite plans for this electrical power could be made.

An Operating Methods Subcommittee was formed, consisting of Mr. Barney Cockburn of the Watson Drilling Company, Mr. M. B. Wilson of the Great Western Production Company, Mr. John Duncan of Delfern Oil Company and Mr. Paul Hollaway of the Cooperative Producing Association. The aim of this Operating Methods Subcommittee was to establish some general recommendations as to the method or cooperative agreement of operation to be followed under unitization. The Committee was to meet at their convenience and formulate plans for the general field operations.

Considerable discussion was made concerning the effectiveness of the present experimental air injection program. The evidence available at the time of the meeting was deemed insufficient by some of the operators to clearly establish its worth. Some of the operators favored the injection of water at higher pressures; consequently, an attempt was made on October 25, 1951, to inject water at higher

pressures into the present air injection well (Tabulation 1). A pump capable of pumping at higher pressures was prepared and sufficient fresh water was made available. The use of fresh water was considered necessary due to extremely high salt content of the pay sand. It is apparent from this test that water is not a reasonable and practical medium to use for injection purposes in the present input well. Other wells in the field may have pay sections with less Bentonitic silts and allow the satisfactory introduction of water; however, this test does demonstrate the inability of the use of water as a general fieldwide injection medium.

The next item of interest was the development of participation percentages by which the individual companies would participatein a fieldwide pressure maintenance program. Several percentages were calculated by the Engineering Committee in order to satisfy all concerned. In general agreement was a percentage calculation, based on the operator's interest in the presently producing wells and acreage in the outlined producing area. A tabulation showing these various percentages has been prepared and is attached hereto (Tabulation 2).

The third calculation, at the suggestion of the Great Western Production Company, concerned the development of company percentage of total production from August 1, 1950, to August 1, 1951. The Cooperative Producing Association in their study of the Caprock Field have shown that a definite effect is being evidenced by the current air injection program and felt that the production from January 1, 1950, to January 1, 1951, prior to the experimental air injection, would be more representative (Column 4, Tabulation 2).

The fifth percentage is based on a comparative ultimate oil recovery as derived from production decline method of analysis, as set forth in Robert D. Fitting's report of June, 1951.

The sixth method, as suggested by British-American Oil Company, was the one-half of the comparative ultimate oil recovery, as shown in the report, weighted against the estimated primary recovery.

It is suggested that the individual companies examine these participation formulas and be prepared at the next meeting to recommend the use of one or a combination of these methods as a fair and equitable basis for fieldwide participation.

At the request of several of the operators, herewith is a brief supplement to the report of June, 1951.

The injection of air has continued at the same daily average volume, 100,000 cubic feet and injection pressure of 470 psig, in the experimental injection well, with only minor shutdowns for repairs (Enclosure 1). The monthly bottom hole pressure surveys have continued to show a pressure and fluid build-up to the south and east of the input well (Enclosures 2, 3, 4). Little increase in gas-oil ratio has been noted; consequently, no indication of by-pass is detected. The offset leases to the injection well continue to show increases oil productive ability over their respective extrapolated production declines (Enclosures 6 through 13). The group of adjacent leases oil production decline curve has been reprepared on a gross oil production basis as it has been difficult to obtain accurate information concerning the net number of producing wells (Enclosure 5). It is evident that the rate of oil production decline has been substantially reduced after the experimental air injection program was commenced.

It is, in the writer's opinion, noteworthy that this one experimental air injection well, with an injected volume of less than the current oil depletion rate of the reservoir, has been able to materially change the producing characteristics of these surrounding wells. It has not only increased the effective bottom hole pressure but retarded the rate of oil production decline. From all indications, the present air injection system is operating satisfactorily, and it has been definitely demonstrated that air is the only practical injection medium for secondary oil recovery in the Caprock Field.

Respectfully submitted,

Robert D. Fitting

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