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3 1969

December 2, 1969

Case 4281

New Mexico Oil Conservation Commission
Post Office Box 2088
Santa Fe, New Mexico

Gentlemen:

Enclosed find application of Wood, McShane and Thams - Colorado for approval of an unorthodox well location. Please set hearing for the earliest possible date.

Yours very truly,

Jason W. Kellahin

Jason W. Kellahin

jwk;jh

Encl. Original and 2 copies.

DOCKET MAILED

Date 12-24-69

BEFORE THE

OIL CONSERVATION COMMISSION OF NEW MEXICO

APPLICATION OF WOOD, McSHANE AND THAMS-COLORADO FOR APPROVAL OF AN UNORTHODOX WELL LOCATION, LANGLIE MATTIX POOL, LEA COUNTY, NEW MEXICO, CONVERSION OF PRODUCING WELLS TO INJECTION, AND ADMINISTRATION PROCEDURE FOR FURTHER DEVELOPMENT.

Case 4288

A P P L I C A T I O N

Come now Wood, McShane and Thams-Colorado, a partnership composed of B. Oliver Wood, Joe B. McShane, Jr., William H. Thams, and Colorado Oil and Gas Corporation, and apply to the Oil Conservation Commission of New Mexico for approval of an unorthodox well location to be used for production purposes in the Humble Oil & Refining Company State "M" waterflood project, and in support thereof would show the Commission:

1. Applicants are the operator of the Humble Oil & Refining Company State "M" waterflood project, which was approved by Oil Conservation Commission Order No. R-2556, and extended by Order No. R-2891.

2. Applicants proposed to drill their well No. 63 at a location 2740 feet from the South line, and 1280 feet from the East line of Section 30, Township 22 South, Range 37 East, N.M.P.M., for production from the Queen formation of the Langlie Mattix Pool, in the State "M" waterflood project.

3. Applicants further propose to convert, at some future date, producing wells Nos. 27 and 39 for water injection providing a forty-acre five-spot injection pattern rather than the existing 80-acre five-spot pattern.

APPLICATION OF WOOD, McSHANE & THAMS - COLORADO

BEFORE THE

OIL CONSERVATION COMMISSION OF NEW MEXICO

CASE NO. 4288

DOCKET NO. 1-70

WEDNESDAY, JANUARY 7, 1970

SANTA FE, NEW MEXICO

APPLICATION OF WOOD, McSHANE AND THAMS - COLORADO FOR AN UNORTHODOX OIL WELL LOCATION AND WATERFLOOD EXPANSION, LEA COUNTY, NEW MEXICO

CASE NO. 4288

DOCKET NO. 1-70

HEARD BY DANIEL S. NUTTER, EXAMINER, OR A. L. PORTER, JR., ALTERNATE EXAMINER

This is an application by Wood, McShane & Thams - Colorado, a partnership, to the Oil Conservation Commission of New Mexico for approval of an unorthodox well location to be used for production purposes, conversion of producing wells to water injection, and administrative procedure for further development.

I. Current Status of Langlie Mattix Pool
Waterflood M State Lease

There are 21 active producing wells in the Queen Sand in the waterflood area on the M State Lease. During November 1969, these wells produced 7,933 barrels of oil and 17,851 barrels of water. The attached plat, exhibit #2 provides well numbers and daily oil and water production during November 1969 and cumulative oil production for each well to December 1, 1969.

There are 19 active injection wells in the Queen Sand on the M State Lease. During October 1969, these wells took 104,098 barrels of injection water at an average well head pressure of 1500 psi. Shown on exhibit #3 are the well numbers and injection rate, well head pressure and cumulative water injected to 1 November 1969.

Thirty one of these active wells are completed through perforations in 2 7/8" casing cemented through the pay section. Slim hole (1.9 inch O. D.) tubing is used both in the injection wells and producers.

II. Production and Injection History Of the Waterflood Program

Humble Oil and Refining Company began water injection into six wells on 19 November, 1963 as a pilot flood operation. These wells numbered 23, 26, 28, 31, 37 and 38 were authorized for conversion to injection by the Oil Conservation Commission Case No. 2879, Order No. R-2556. These six wells are shown circled in orange on the plat exhibit #1. The flood was expanded in 1965 after approval by the Oil Conservation Commission in Case 3219, Order No. R-2891. The present 80 acre five spot flood pattern is shown on the plat exhibit #1, with each 5-spot outlined in orange.

A tabulation showing oil, gas and water production along with injection rates and pressures by months from November 1963 through November 1969 is presented as exhibit #4. The exhibit #5 is a group of curves plotted from the above data on semi-log paper. This data provides the production and injection history of the lease for the life of the flood.

A study of the four wells numbered 27, 28, 38 and 39 which surround the proposed new producer #63 has been made to provide

information about primary and secondary recoveries. Primary recovery from these four wells to 1/1/64 was 80,897 barrels. Extrapolated future primary from 1/1/64 to economic limit was 30,120 barrels resulting in an ultimate primary from the four wells of 111,017 gross barrels. This is equal to 27,750 barrels per well, or 36.5 B/Ac-ft.

The core analysis from a near by well #19, and log data indicates the following reservoir conditions in the area of the proposed #63 well:

Average Net Pay Thickness	19.0 feet
Average Net Pay Porosity	13.3%
Average Measured Water Saturation	39.5%
Estimated Water Saturation	35.0%
Estimated Oil Saturation	65.0%

Calculations indicate the original stock tank oil in place to be 422 barrels per acre foot. Ultimate primary recovery is calculated to be 36.5 barrels per acre foot or 8.6% of the original stock tank oil in place. Assuming that secondary recovery will be equal to one times ultimate primary recovery, the 80 acre flood pattern now in operation should recover a total of 111,000 barrels primary and secondary per 80 acre five spot.

III. Future Plans for Development of 40 Acre Waterflood Pattern

The 8.6% of OSTOIP primary recovery would suggest that, the primary recovery well density of 40 acres was not adaquate.

Solution gas drive reservoirs of this type should be expected to recover approximately 15% of OSTOIP. Calculated ultimate primary recoveries, based on 15% of OSTOIP would indicate an effective drainage of 57.3% of 40 acres, or 22.9 net acres. If through infield drilling and 40 acre five spots the calculated primary of 15% and secondary equal to primary could be produced, then an 80 acre tract would produce 191,520 barrels. The additional recovery would equal 80,520 barrels. A secondary recovery of more than one to one would substantially increase the additional recovery.

It should be noted that each new producer drilled will be completed using $4\frac{1}{2}$", $5\frac{1}{2}$" or 7" production casing. This will allow the production of large volumes of fluid usually encountered in waterflood production. An additional benefit of the new wells would be the ability to use standard completion techniques and down hole equipment as well as normal procedures for protection against scale and corrosion.

Existing producers will be converted to water injection wells through coated 1.9" O. D. tubing and packer. This will provide for increased injection rate per unit area which in turn should increase production rates. The exhibit #6 attached is a plat showing the proposed expanded 40 pattern. Well #63 is shaded in orange on the plat. The proposed 40 acre pattern will be developed only as satisfactory results and economics dictate.

IV. Summary

It is estimated that the proposed 40 acre flood pattern when fully developed will produce an additional 765,000 gross barrels of oil. This 765,000 barrels of oil is not

otherwise recoverable, thereby the New Mexico Oil Conservation Commission will prevent waste by approval of this application.

Wood, McShane & Thams - Colorado, is the operator of the Humble Oil and Refining Company "M" State waterflood project.

The operator proposes to drill their well No. 63 at a location 2740 feet from the South line, and 1280 feet from the East line of Section 30, Township 22 South, Range 37 East, N.M.P.M., for production from the Queen formation of the Langlie Mattix Pool, in the State "M" waterflood project.

The operator further proposes to convert, at some future date, producing wells Nos. 27 and 39 for water injection providing a forty-acre five-spot injection pattern rather than the existing 80-acre five-spot pattern.

The Operator further applies to the Oil Conservation Commission for an order providing for administrative approval for the drilling of further wells at unorthodox locations within the Langlie Mattix State "M" waterflood project under such rules as the Commission deems proper, with further provision for an administrative procedure for the conversion of producing wells to injection, or from injection to production, whether such wells have received a response from the waterflood project or not.

Respectfully submitted,

WOOD, McSHANE & THAMS - COLORADO

By B. Oliver Wood
B. Oliver Wood, P. E.

By Joe B. McShane
Joe B. McShane, P. E.

REGISTERED PROFESSIONAL ENGINEERS