

BEFORE THE  
**Oil Conservation Commission**  
SANTA FE, NEW MEXICO  
September 15, 1955

IN THE MATTER OF:

CASE NO. 959

**TRANSCRIPT OF PROCEEDINGS**

**ADA DEARNLEY AND ASSOCIATES**  
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BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
September 15, 1955

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IN THE MATTER OF:

Application of Southern California Petroleum Corporation for an order granting permission to establish and operate a pilot gas injection project in the Langlie-Mattix and Cooper-Jal Oil Pools, Lea County, New Mexico. Applicant seeks an order granting permission to inject gas into its A. E. Thomas Well No. 5, SW/4 SE/4 Section 24, Township 24 South, Range 36 East, and its S. W. Harrison Well No. 5, NE/4 NW/4 Section 25, Township 24 South, Range 36 East; both wells producing from the Seven Rivers Formation. Applicant further desires the establishment of rules to govern the use of make-up gas for injection wells and a revision of the 10,000 to 1 GOR limit on its leases in Section 24 and 25, Township 24 South, Range 36 East.

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Case No. 959

BEFORE:

Honorable John F. Simms  
Mr. E. S. (Johnny) Walker  
Mr. William B. Macey

TRANSCRIPT OF HEARING

MR. MACEY: The next case on the docket is Case Number 959.

MR. WARREN:- Case 959 is the application of Southern California Petroleum Corporation, for authorization to establish and operate a pilot gas injection project.

J. A. W A R R E N ,

called as a witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. GURLEY:

Q State your name for the purpose of the record.

A J. A. Warren, Division Engineer for Southern California Petroleum Corporation, Midland, Texas. I have testified before the Commission.

This is the application for authorization to establish and operate a pilot gas project involving the Seven Rivers Formation of the Langlie-Mattix and Cooper-Jal Oil Pools in Sections 24 and 25, Township 24 South, Range 36 East, Lea County, New Mexico, NMPM.

By the above application Southern California Petroleum Corporation has requested the New Mexico Oil Conservation Commission to consider its request for permission to operate a pilot gas injection project in a portion of the Langlie-Mattix and Cooper-Jal Oil Pools.

(Marked Southern California Petroleum Corporation's Exhibits 1, 2, 3 and 4, for identification.)

This map, submitted as Exhibit 1, shows the area of the proposed pilot gas injection project outlined in red and includes a block of five contiguous oil and gas producing leases owned and operated by Southern California Petroleum Corporation, comprising a total area of 680 acres and 14 oil and gas wells producing from the lower Seven Rivers formation. The specific leases involved are described as follows: The Maggie Dunn Lease, which is 120 acres, with three Seven Rivers Wells on it; the Phillips Lease with two Seven Rivers Wells, 80 acres; the Tomas Lease, 160 acres with four Seven Rivers Wells; the Van Zandt Lease with 160 acres, three Seven Rivers Wells; the Harrison Lease, 160 acres with two Seven Rivers Wells. The

The first proposed gas injection well is circled in red and is

approximately in the center of the proposed pilot area.

The map also shows all producing oil or gas wells and dry holes and the names of lessees and lessors within one-half mile of the boundary of the proposed pilot gas injection area. Cooper-Jal, Langlie-Mattix and Jalmat pool oil and gas wells are differentiated by symbols, as shown in the lower right corner of the map. The pool from which each offset operator's well is producing was determined from the August Proration Schedule.

This company has previously suggested the possible desirability of injecting gas in this area during the hearings on the ex-Falby-Yates Field (Case 841) which formerly encompassed the presently proposed pilot gas injection area. The possibility of maintaining the reservoir pressure and oil productivity of these Seven Rivers wells for a greater length of time by gas injection, was strongly indicated to us by the results of the first general Bottom Hole Pressure (BHP) survey in February 1955, only six months after the development of lower Seven Rivers production in this area was complete. This survey showed that the average BHP had dropped 397 psi - or approximately 1.5 psi per day - and that only 350 barrels of oil had been produced for each pound of BHP lost. This alarming drop in pressure has continued at only a slightly lower rate - pressures run September 12, 1955, showed an average loss of 231 psi in the last seven months, a drop of 1.1 psi per day, and only 317 barrels of oil have been produced for each pound of BHP lost. Oil production from the 14 wells has declined from the peak of 552 B/D in August 1954 to an average of 265 B/D in August 1955. The present low rate of production is, of course, the primary reason we are proposing to inject gas in this area. Only one well is now pumping but there are

at least four other wells that are ready for pumps, and at the present rate of production and BHP decline, the rest soon will be. We feel that the installation of pumping units will hasten the rate of BHP decline and result in a low recovery of oil. Since we have thin, tight sands in these wells, it seems reasonable and probable that gas injection will result in longer flowing life and greater recovery of oil from these wells.

Exhibit II, consisting of a set of five graphs, one for each of the producing leases before described as comprising the pilot gas injection area, is presented to show the production history of each lease. Each lease graph shows the results of BHP surveys on specific wells, the monthly production of oil for the lease, and the average GOR for the lease by months. Data for the preparation of these graphs was taken from the Operator's Monthly Report (Form C-115) as filed with the New Mexico Oil Conservation Commission.

To the best of our knowledge, all wells within the scope of the proposed project are producing only from the Yates or Seven Rivers formations, and the lower Seven Rivers sands are the only zones that this project is proposed to affect. In the 14 Southern California Petroleum Corporation wells within the pilot gas injection area, which were completed from February to July 1954, the lower Seven Rivers sands that are open to the bore holes occur between the approximate depths of 3390 and 3350 feet ( -105 to -230 feet sub-sea). All of these 14 wells are within the horizontal and vertical limits of the specific portions of the Cooper-Jal and Langlie-Mattix oil pools covered by Commission Order No. R-640, which became effective July 1, 1955 - i.e. the intervals open to the bore holes are within 250 feet above the base of the Seven Rivers formation.

The work of the New Mexico Oil Conservation Commission Stratigraphic Nomenclature Committee was followed in making this determination.

The first proposed gas injection, Thomas No. 5, was chosen because of its central location in the pilot area, its mechanical condition is satisfactory, the zone open to the bore hole is typical of the other wells in the pilot area, and the well needs a pumping unit. Exhibit III, a Schlumberger Laterolog and Microlaterolog are submitted to show the depth and character of the formations penetrated. These logs show that the well was drilled to a total depth of 3575 feet on February 23, 1954, and indicates the three sand intervals that are typical of this company's 14 completions in the pilot area. These intervals are: 3473-3486, 3505-3514, and 3524-3538 feet. The base of the lower sand is at a sub-sea depth of -220 feet. Of the total of 36 feet of oil sand in these three intervals, it is estimated, from logs and cores, that 9 feet were affected by fracture treatment and have been producing most of the oil. This is further indicated by the results of analyses on core samples from these sand intervals, a copy of which is admitted as Exhibit IV. The averages of the analyses show an effective porosity of 17.0%, permeability of 18.6 md, residual oil saturation of 14.0%, and water saturation of 47.8%.

5½", 14" and 15.5#, J-55 new seamless casing was cemented at 3472 feet with 150 sax at the shoe and 150 sax through ports at 1211 feet. The casing was pressure-tested to 1000 psi at the time cement was drilled out and 1500 psi at the time the formation was fractured. 2-3/8" OD, 4.70#, J-55 new seamless tubing was landed at a depth of 3539 feet with a Guiberson "G-2" Production Packer at 3446 feet.

It is believed that gas can be injected into this well satisfactorily in its present mechanical condition.

The gas for injection into Thomas No. 5 is to be procured from the casinghead gas produced on the Thomas lease from the three other Seven Rivers wells. The volume presently available is approximately 180 MCF per day, and it would first be attempted to inject this amount during a test period to determine the susceptibility of the formation to gas injection. The compressor equipment to be installed is capable of injecting approximately 500 MCF per day at 1000 psi. If the formation takes this amount of gas, 180 MCF at reasonable pressure, we would propose to gradually increase the rate of injection up to a tentative maximum of about 500 MCF per day. The additional make-up gas required under these conditions we would propose to take from the Thomas Jalmat pool wells, and if more were needed, from one or more of the remaining leases within the pilot gas injection area.

We further request that if this gas injection project is found to be practical, and this operator should desire to extend the injection to other wells within the pilot gas injection area, that such expansion could be allowed by administrative approval; provided, of course, that offset operators have full knowledge of the results of the project and that we have their cooperation.

Further, we request the order to include approval to transfer the present allowable ( or potential at the time of conversion) of a well converted to gas injection to one or more wells on the same lease producing from the same pool as the injection well. This rule would become effective only if the gas injection were sufficiently successful to increase the productive capacity of one or more wells

to above top allowable. It has no meaning now, since all wells within the pilot gas injection area are sub-allowable.

Since it is quite possible that gas injection would increase the producing GOR of one or more wells within the pilot gas injection Langlie-Mattix oil pools, it is requested that the Commission consider a net GOR rule which would give the operator allowable credit by reason of gas injected. No change in the limiting GOR is advocated, but we are suggesting that if the producing GOR of a well becomes greater than 10,000:1 on a lease where produced gas is being injected the operator should be allowed credit for gas injected so that well can produce the oil it is capable of up to top allowable. One rule under which this company is operating in Texas could apply to this project as follows:

"The permitted GOR of each well shall be 10,000 cu. ft. per bbl. of oil produced. Any well producing with a GOR in excess of 10,000:1 shall be allowed to produce a daily volume of gas equal to the top daily oil allowable multiplied by 10,000 cu. ft. This volume is the daily gas limit for such well. If gas is returned to the producing formation the permitted net GOR shall be 10,000:1. Net gas is defined as the difference between the monthly produced gas volume and the volume of gas returned to the producing formation in that month. The net gas volume divided by the bbls. of oil produced in the same period equals the net GOR. The daily gas limit divided by the net GOR gives the adjusted daily oil allowable".

Another suggested formula is:

Adjusted allowable - Top daily oil allow.  $\times$  10,000 / Vol. gas injected  
(Limited to top) Producing GOR



Southern California Petroleum Corporation submits that the approval of this pilot gas injection project will not cause waste or injure correlative rights, but will in all probability result in more efficient and complete recovery of oil and gas from this reservoir.

We ask the cooperation and consultation of offset operators in order that all producing wells in the vicinity of a gas injection well may be watched closely for signs of gas channelling or increasing GOR's. If and when favorable results of this project should occur, we would hope for the cooperation of our offset operators in expanding the affected area.

MR. MACEY: Is that all you have?

A Yes.

MR. MACEY: Do you wish to offer the exhibits?

A Yes, I offer the exhibits 1, 2, 3 and 4.

MR. MACEY: Were these exhibits prepared by you?

A Yes.

MR. MACEY: Prepared by you and under your direction?

A Yes, under my direction.

MR. MACEY: Without objection they will be received. Any questions?

CROSS EXAMINATION

By MR. MANKIN:

Q You indicate that you may wish to expand this, and use gas from the Southern California oil wells, which under the Thomas Lease is Number 1, 3 and 4. There would be no difficulty in expanding the project, using the same gas of this lease, would there?

A I don't think so.

Q I mean from the purchasers.

A No, they just wouldn't be getting it, for the time being any way.

Q Would you be agreeable, if the project worked satisfactorily, to other operators joining the project and expanding at a later date?

A Yes, we would welcome anyone joining us.

Q You are not really suggesting that the gas-oil ratio 10,000 to 1 be changed in any manner; all you are asking is for gas credit?

A Gas credit only, on the specific lease and the specific zone where gas is being returned to the zone.

Q The reason I mentioned that, the call of the hearing, say -- shows maybe a change --

A No.

Q Your application didn't so state.

A No.

By MR. NESTOR:

Q I have a question. I think it is a matter of understanding. I am not quite sure I understand the last formula for determining the allowable of the well. I wonder if you could explain that again, please? Will this formula permit the well to get an allowable higher than the top that would be normally assigned?

A No, I said the daily allowable is limited to top. Your calculation may come out more than that.

MR. MACEY: Anyone else have a question of the witness? If no further questions the witness may be excused.

(Witness excused.)

MR. MACEY: Anyone have anything further?

MR. HINKLE: Mr. Hinkle, of Roswell, representing the Humble Oil and Refining Company. The Humble is interested in this case to the extent that they have two top allowable oil wells in the immediate area that may be affected by this secondary recovery program. The Humble is not opposed to the application as a conservation measure and a secondary recovery program, but the Humble does have some reservations as to the probable results of the injection of gas in this particular area because it may cause channel and may affect other wells. For that reason the Humble would like to request that if an order is granted in this case, that it be placed on a temporary basis and after six months that the Southern California Petroleum Corporation report to the Commission, and the case be set down for hearing at that time, rehearing, so as to give an opportunity to any operators, who may be adversely affected by the injection of the gas in the area, to be heard.

MR. WHITE: Charles White, appearing for the Texas Company. We also concur in what Mr. Hinkle has just stated. The Texas Company is one of the offset operators to the east, being the lease-owner in the northwest quarter of Section 30. It is to be noted that the Harrison Well for the gas injection program is in the northwest quarter of Section 25 and they are, and the applicant is the owner of a leasehold interest in the northeast quarter. The Texas Company has no objection to the gas injection program in the Harrison Well, nor in the Thomas Well. However, we do object to any expansion of this gas injection program into any other leases, especially the north half, east quarter of Section 25 without there first being a hearing, and the application states that should the gas injection program on the Harrison Well Number 5 and Thomas Well

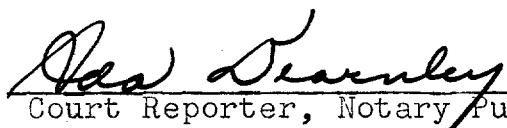
Number 5 be practical, that it is proposed to extend the gas injection to other leases and wells in the area. Before any extension is granted, we request that the order limit the injection program merely to Harrison Well Number 5 and the Thomas Well, and before any expansion is carried on that we first have a hearing, after due notice.

MR. MACEY: Anyone else have a statement they wish to make? If nothing further we will take the case under advisement.

STATE OF NEW MEXICO )  
 : SS  
COUNTY OF BERNALILLO )

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission, Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 9th day of October, 1955.

  
Court Reporter, Notary Public

My Commission Expires:  
June 19, 1959.