SOUTHERN CALIFORNIA PETROLEUM CORPORATION
Box 1071, Midland, Texas

September 15, 1955

RE: APPLICATION OF SOUTHERN CALIFORNIA PETROLEUM CORP. FOR AUTHORIZATION TO ESTABLISH AND OPERATE A PILOT GAS INJECTION 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, NMPM.

CASE 959 - Prepared Statement

By the above application Southern California Petroleum Corp. 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, situated within Sections 24 and 25, T24S, R36E, N.M.P.M., Lea County, New Mexico.

This map, submitted as Exhibit I, 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 Corp., 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:

Maggie Dunn:	$SW\frac{1}{4}NE\frac{1}{4}$ & $E\frac{1}{2}NE\frac{1}{4}$ of Sec. 24,	120 acres,	3 wells.
Federal-Phillips:	$E\frac{1}{2}SE\frac{1}{4}$ of Sec. 24	80 "	2 "
A. E. Thomas:	$E\frac{1}{2}$ $SW\frac{1}{4}$ & $W\frac{1}{2}SE\frac{1}{4}$ of Sec. 24,	160 "	4 "
Van Zandt:	$NE\frac{1}{4}$ of Sec. 25	160 "	3 "
S. W. Harrison:	$NW\frac{1}{4}$ of Sec. 25	160 "	2 "

The first proposed gas injection well, Thomas No. 5, is located 1980 feet from the east line and 990 feet from the south line of said Section 24, and is indicated on the map by a red circle. It should be noted that this well is very nearly in the center of the proposed pilot gas injection 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 3550 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 Stratagraphic Nomenclature Committee was followed in making this determination.

The first proposed gas injection well, 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 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 submitted 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 to 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 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 area to above the 10,000:1 limit now in effect in the Cooper-Jal and 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:

$$\text{Adjusted Allowable (Limited to top)} = \frac{\text{Top daily oil allow. x 10,000} \not{/} \text{ Vol. gas injected}}{\text{Producing GOR}}$$

Southern California Petroleum Corp. 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.

Respectfully submitted,

SOUTHERN CALIFORNIA PETROLEUM CORP.

By: _____
Division Engineer