

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 20, 1961

EXAMINER HEARING

CASE 2385

TRANSCRIPT OF HEARING

DEARNLEY-MEIER REPORTING SERVICE, Inc.

ALBUQUERQUE, NEW MEXICO

PHONE CH 3-6691



BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
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EXAMINER HEARING

IN THE MATTER OF:

Application of Texaco Inc. for a unit agreement and for)
a waterflood project, Lea County, New Mexico. Appli-)
cant, in the above-styled cause, seeks approval of the)
West Lovington Unit Agreement, covering 2,472 acres,)
more or less, in Townships 16 and 17 South, Range 36) Case
East, Lea County, New Mexico. Applicant further seeks) 2385
authority to institute a pool-wide waterflood in the)
West Lovington Pool by the injection of water into the)
San Andres formation through 18 wells in Sections 3,)
4, 5, 6, 7, 8, and 9, Township 17 South, Range 36 East.)

BEFORE:

Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: Call 2385.

MR. MORRIS: Application of Texaco Inc. for a unit agree-
ment and for a waterflood project.

MR. WHITE: Charles White of Gilbert, White & Gilbert,
appearing on behalf of the applicant. We have one witness to be
sworn.

(Witness sworn.)

CHARLES ROBERT BLACK

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

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DIRECT EXAMINATION

BY MR. WHITE:

Q Mr. Black, will you state your name, please?

A Charles Robert Black.

Q By whom are you employed, and in what capacity?

A Texaco Inc. as a petroleum engineer.

Q Have you previously testified before the Examiner or the Oil Conservation Commission?

A Yes, I have.

Q And are you familiar with the subject application?

A Yes, I am.

Q Will you briefly state what Texaco seeks by the application?

A This is the application of Texaco Inc. as the initial operator in the proposed West Lovington Unit for (1) The approval of the West Lovington Unit agreement, (2) authority to initiate waterflood activity in the West Lovington Pool and (3) the approval to convert 18 wells to injection, to form a nine-spot on a pool-wide basis.

Q What steps has Texaco taken to unitize the West Lovington Pool?

A The first meeting of the operators in the West Lovington Pool was held on November 19, 1957 in Midland, Texas. This meeting was called by Texaco Inc. It was generally agreed to, at that meeting, by all the operators, the West Lovington Pool was in an

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advanced stage of depletion and the possibility of secondary recovery should be investigated. Consequently an Engineering Committee was formed and charged to investigate the feasibility of secondary recovery operations.

This Engineering Committee conducted a study and found that waterflood operations were feasible. This Committee recommended that waterflood operations be conducted on a unitized basis. The Committee was then charged by the Operators' Committee to develop certain participation factors that would be used in a participation formula for unitized operations. The participation formula that will be hereinafter presented is a result of the Engineering Committee's work and has been unanimously approved by all the operators in the field and tentatively accepted by them as an equitable representation of their interest in the secondary recovery project.

Q Will you refer to what has been marked Exhibit 1 and explain what that is, please?

A Exhibit No. 1 is a plat showing the proposed West Lovington Unit and the immediate area surrounding the unit. The proposed unit is outlined by the hashed line, and contains some 2,472.21 acres. The unit area contains 58 producing wells and 4 undeveloped locations which are shown by the red circles. That is all on Exhibit 1.

Q Will you refer to Exhibit 2, which is a tabulation; explain that to the Examiner?



A Exhibit No. 2 is a tabulation of the area to be designated as the West Lovington Unit. This more particularly defines the unit. It sets out the lands that will be dedicated to the unit in Section 33, Township 16 South, Range 36 East, and the lands that will be dedicated in Sections 3 through 9, Township 17 South, Range 36 East.

Q It is more or less self-explanatory, is it not?

A Yes, sir, it is. It just more particularly defines the unit.

Q Mr. Black, is the proposed unit confined to one or more reservoirs?

A The Unit Agreement itself is limited to the upper San Andres formation, which is defined as that underground reservoir the top of which is found at 4,727 feet, and the base of which is found at 5,160 feet on the gamma ray-neutron log of the Cities Service Petroleum Company State of New Mexico "A.U." lease Well No. 1. This well is located 660 feet from the North and West lines of Section 10, Township 17, Range 36 East, Lea County, New Mexico.

Q And this is marked as Exhibit No. 3?

A Exhibit No. 3 is a log of this well, with the top and the base of the upper San Andres formation being marked in red.

Q Will you refer to, and explain, Exhibit No. 4?

A Exhibit No. 4 is a tabulation of the participation factors for the proposed West Lovington Unit. The first column is a list of the operators and their particular leases that will be included



in the unit.

Q Does this include the four undrilled locations which, I believe, are shown on Exhibit No. 1?

A Yes, it does. Under Humble there is one location, the SE/4 of the NE/4 of Section 8; under Pan American there are three locations, the NE/4 of the SE/4 of Section 4, the SE/4 of the NE/4 of Section 4, and the SW/4 of the NW/4 of Section 5. These are the four undrilled locations that will be drilled by the unit.

Q Now, will you continue with the explanation of the Exhibit?

A Column 2 is a tract number which will be assigned to each of the leases for the purpose of unitization. Column 3 is an adjusted cumulative production as of September the 1st, 1951.

Q Will you explain how you have arrived at the adjusted cumulative production as shown in Column 3?

A This adjusted cumulative production is adjusted in the sense that a cumulative production figure has been assigned to the four undrilled locations and to the Texaco Cities Service Federal Well No. 1 which was drilled after September 1st, 1959. The cumulative production figure was determined by the use of an isocumulative map.

Q Is that Exhibit No. 5?

A Yes, it is.

Q Explain Exhibit 5 and then revert back to the explanation of 4.

A Exhibit 5 is an isocumulative map as of September 1st,



1959. This is a contour map based on cumulative production as of that date. The unit boundaries are shown in yellow, and the four undrilled locations are shown by the red triangles. This map was used to determine the cumulative production for these four undrilled locations and the Texaco Cities Service Federal Well No. 1.

Q Refer to Exhibit 4.

A Again to Exhibit No. 4, the next column is adjusted cumulative production percent, which is self-explanatory. The next column is gross acre feet. Gross acre feet was determined by the use of a structure map and an oil-water contact of a minus 1200 feet. Next column, gross acre feet percent. The next column, surface acres, which is a list of the actual surface acres in each tract. It is followed by a surface acres percent. The next column is current rate production based on the first eight months' production for 1959. Now, the Texas Cities Service Federal Well No. 1 was not completed during this first eight months of 1959, so, as outlined in the Unit Agreement, a 60-day production period -- after the well was completed it was produced for 60 days, and then a 30-day production test was taken on the well. This 30-day production test was then multiplied by eight to obtain the current rate of production.

The following column is the current rate percent, and the last column is the participation factor for each tract in the unit.

Q Mr. Black, what is this participation factor based upon, that is, the last column?



A This factor is based on a formula of 50 percent cumulative production, or adjusted cumulative production, 25 percent gross acre feet and 15 percent surface acres. It is denoted at the base of Exhibit 4 by the asterisk, 15 percent, 10 percent current rate. Also at the base of Exhibit No. 4 is a breakdown of the percent of the Federal acreage involved. All of the lands in the West Lovington Unit are either, the royalty interest is held either by the Federal Government or the State Government. The Federal Government, under the participation, holds 2.623370 percent of the royalty interests, and the State Government holds 97.376630 percent of the royalty interests.

Q Mr. Black, is Exhibit No. 5 the proposed Unit Agreement?

A Exhibit 6.

Q Six, rather.

A Yes. Exhibit No. 6 is a copy of the proposed Unit Agreement for the development and operation of the West Lovington area. This Unit Agreement is patterned after the unit agreements for the South Caprock-Queen and the Caprock-Queen units which have been previously approved by the Commission.

Q Has the State Land Office indicated its approval of this agreement?

A The State Land Office has received a copy of this agreement and they have given tentative approval to this proposed agreement.

Q Has the agreement been submitted to the U.S.G.S. for their



approval?

A To my knowledge the Unit Agreement has been submitted to the U.S.G.S. in Roswell and they have transmitted it to Washington D.C. to be approved by the Director of the U. S. Geological Survey.

Q Have any of the operators within the proposed unit ratified or signed up?

A No, sir, they haven't. This Unit Agreement hasn't been ratified by any of the operators.

Q Why?

A There is some possibility that when the Unit Agreement is returned from the Director of the U.S.G.S. there may be a few minor word changes, if any changes at all, and if these word changes are made they would have to be incorporated into a new unit agreement and, therefore, these operators would have to ratify this Unit Agreement again. It is anticipated all operators will ratify the Unit Agreement as approved by the Commission and the U.S.G.S., and at the time the Unit Agreement is completely ratified a copy of the Unit Agreement, as ratified, will be submitted to the Commission.

Q Have these operators indicated that they would approve it, ratify the agreement after the U.S.G.S. has approved it?

A Yes. We have obtained tentative approval from the operators and we don't anticipate any difficulties in obtaining ratification.

Q Directing your attention to the pool characteristics, have

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you made a study of the pool characteristics?

A Yes, a study of the pool itself was made by the West Lovington Engineering Committee.

Q Will you give the results of these studies?

A The West Lovington Field is located in the center of Lea County, approximately 20 miles northwest of the City of Hobbs. The field was discovered in June, 1944, and production is obtained from the San Andres formation, which is of the Permian system, and the top of the San Andres is encountered approximately 4,750 feet. The productive area is confined to a anticlinal structure with poor porosity and poor permeability depicting the horizontal limits. Average gross pay, 390 feet, with the lower one-half of the gross pay interval containing the majority of the net pay. The zones considered productive constitute approximately 12 percent of the gross pay interval. One core analysis was available for study by the Engineering Committee and this was on Pan American State "E", Tract 20, Well 11, well cored through the San Andres formation. The core indicated the net pay zone had an average porosity of 8.37 percent, average permeability, 8.35 millidarcies. Water saturation data itself was not available. However, for the purposes of calculation a water saturation of 25% was assumed. An oil-water contact, as such, was not definable in the reservoir. However, a subsea datum of minus 1200 feet was adopted by the Engineering Committee as being the approximate oil-water contact. This depth coincided with the majority of the tests where signifi-

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cant water was produced.

The West Lovington Pool produces from a solution gas drive reservoir and has a productive area of approximately 2,472 feet. Development was essentially completed in 1949; however, in 1960 Texaco did drill one additional well, Cities Service Federal Well No. 1. Of the 59 producing wells 58 are still currently on production, and it is believed at this time the field is approximately 93% depleted as a primary means.

Q Will you refer to, and explain, Exhibit No. 7?

A No. 7 is a structure map contoured on top of the San Andres formation. As shown on the exhibit the boundary of the unit is shown by the yellow line, and the cross sections which will be presented as the following exhibit are shown on A A' and B B' by the red lines. There were 17 radioactivity logs available in the field; for the construction of this structure map all available sample logs that could be obtained by the Committee were used to pick the tops of the San Andres on the other wells. In some cases as many as five or six sample logs were studied and analyzed before the top of the San Andres was picked in those particular wells.

Q In your opinion is this a reasonable representation of the tops of the San Andres in this area?

A Yes, it is. It should be a reasonable interpretation of the top of the San Andres in this immediate area. I might say that the structure map indicates that the West Lovington Field is producing from an anticlinal structure that trends northeast by



southwest.

Q Now, will you refer to what has been marked Exhibit No. 8 and explain that, please?

A Eight, as mentioned previously, are two cross sections through the field designated A A' and B B'. The trend of these cross sections was shown on Exhibit No. 7. A A' is a north-south cross section and B B' is an east-west cross section through the field. The top of the San Andres is marked on this cross section.

Q Will you refer to what has been marked Exhibit No. 9 and explain that, please?

A Exhibit No. 9 is the performance history of the West Lovington Field. It will be noted that the peak oil production, or daily oil production, was in the first part of 1949 at which time a daily oil production of 2200 barrels of oil per day was reached. Since that time the daily oil production has steadily declined until June of 1961 a total of 375 barrels of oil per day was produced from the field, and this was an average of 6.5 barrels per day per well. The initial bottomhole pressure was 1800 PSIG, and has declined to somewhat less than 300 PSIG. There haven't been any bottomhole pressures recorded in this field since 1954.

The gas-oil ratio was initially 250 cubic feet per barrel, and has increased steadily. It reached a maximum of 2700 cubic feet per barrel in 1958, and in June, 1961, had declined to 2300 cubic feet per barrel. The daily water production has remained at



or near 100 barrels of water per day with the exception of the last part of 1950 and all of 1951, and for a three-month period during 1953 when water production was substantially increased.

Q Do you have any explanation for that increase?

A No, sir. This has not been explained in the records available.

Q Mr. Black, from your studies, is it your opinion that the subject pool now is in the stripper stage and is adaptable to secondary recovery operations?

A Yes, as stated previously it is believed approximately 93 percent netted as far as primary reduction, and should be adaptable to secondary recovery.

Q What type of waterflood operation does Texaco propose?

A The decision to waterflood the field was based on, partly, on the fact that core data indicated that there was no fracturing present in the reservoir matrix. This absence of fracturing is of a primary importance in that it probably would mean a more uniform permeability distribution could be expected throughout the reservoir and, therefore, it is believed that this San Andres reservoir should be susceptible to waterflood operations. It is proposed to initiate an inverted nine-spot pattern and convert 18 wells in the field to water injection.

Q These proposed injection wells set forth on Exhibit No. 10?

A Yes, sir, Exhibit 10 is a tabulation of the proposed injection wells. It shows the company which is presently operating



these wells, the lease and the well number, and the location of the proposed injection wells.

Q What type of injection program is presently planned?

A It is estimated that during fill-up approximately 20,000 barrels a day of water should be injected into the reservoir. After the reservoir void has been filled it is estimated a maximum of 600 barrels per well per day could be injected into the reservoir. This is approximately 11,000 barrels per day total for 18 injection wells. The maximum injection pressure should be between 1500 and 2,000 PSI.

Q What do you anticipate the life of the pool to be under the proposed injection?

A It is anticipated the life of the field under secondary operations will be approximately 16 years.

Q What additional oil do you expect to recover on the proposed program?

A By conducting waterflood operations it is anticipated that the secondary oil will be equal to, or possibly exceed the amount produced under ultimate primary conditions.

Q Will you identify and explain Exhibit 11?

A Exhibit No. 11 is, again, a plat showing the proposed unit area. The proposed 18 injection wells are circled in red, the water lease currently held by Texaco Inc. is bordered in yellow, and the proposed location of the water supply well is shown circled in green.



Q Will you explain the terms of your water lease, and state what permits, if any, you have obtained?

A Texaco currently holds a fresh water lease on the entire Section 36, Township 16 South, Range 36 East. This lease permits Texaco to produce 942 acre feet of fresh water per year from two wells that can be located in the SE/4 of the SE/4. The permit was granted under file numbers L-4084 and L-4085, and they were granted by the State Engineer's Office.

Q How many wells do you presently propose to drill, and from what formations?

A It is proposed that we will drill one water supply well in the SE/4 of the SE/4 of Section 36. This water supply well will be drilled and completed in the Ogilvie sand at a depth of 250 feet.

Q Is the location of that well shown on Exhibit 11?

A Yes, it is, it is shown by the green circle.

MR. NUTTER: Will you give us the casing program and what equipment you intend to install?

A It is proposed we will drill a 250-foot well and set 12-3/4 inch casing, slotted from 80 feet to total depth. A ten-inch turbine pump, 60 HP electric motor will be set on the well, and it is anticipated it will supply 20,000 barrels of water per day.

Q In your opinion, will that be adequate for your operations?

A Yes, it should. Maximum injection should occur during fill-up and we anticipate maximum injection rate of 20,000 barrels



of water per day.

Q Will you identify Exhibit 12 and explain that exhibit?

A Twelve is a tabulation of the completion data for each of the 18 wells that we propose to convert to injection wells. This exhibit shows the operator and the lease, the well number, the total depth of the well and the completion interval of the well. Shown are the size, the depth, and the sacks of cement used for surface casing, the intermediate casing and the production casing. Injection will be down a string of tubing below a packer, and the packer will be set above it, in the casing above the top of the San Andres formation.

Q Is the exhibit otherwise self-explanatory?

A Yes, it should be.

Q Do you have any logs on the proposed injection wells?

A Yes, sir, we do. We have nine logs available of the 18 proposed injection wells.

Q Those have been identified as Exhibits 13 through 21?

A Yes, they have. The packet itself has been identified Exhibits 13 through 21; each log itself has not been marked as an exhibit. There is one copy of the nine logs available. As was stated previously, this field was discovered in 1944, and consequently there are not too many logs available on the wells in the field.

Q Is the total depth and top of the San Andres depicted upon each of the logs?



A Yes, it is, total depth of each well and the top of the San Andres are marked in red on each of the logs.

Q Why do you, in this instance, propose a pool-wide waterflood instead of the conventional pilot type?

A As stated previously it is estimated that this reservoir is approximately 93 percent depleted as to primary means. This reservoir is in the stripper stage. This is evidenced by the fact the daily oil production averages 6.5 barrels per well per day. It is the express desire of all operators in the field to initiate a waterflood program only on a pool-wide basis. It is believed this reservoir, the San Andres reservoir, will be, or should be susceptible to waterflooding, and in this case a pilot waterflood is not necessary. There are numerous other San Andres waterfloods currently being conducted in the San Andres formation, and indications from these waterfloods indicate that the San Andres formation can be successfully waterflooded.

Q Are any of these other San Andres waterfloods of which you speak presently in operation?

A Yes, Texaco Inc. is currently conducting waterflood operations on our Bob Slotter lease in the Slotter Field, Hockley County, Texas.

Q Will you refer to Exhibit 22 and state what that is and explain it, please?

A Twenty-two is a plat showing the locations surrounding the pilot waterflooding being conducted in the Slotter Field. There



are ten injection wells and 22 producing wells; six of the producing wells are located inside the pattern, and 16 of these producing wells are located outside of the pattern.

Q Are the input wells identified?

A Yes, and producing also. The input wells are identified by the arrow drawn through them; the pilot area itself is identified and shaded in red, and producing wells are the six wells inside the pattern, and the 16 wells immediately offsetting the injection wells.

Q Could you give us some information in regard to the characteristics of the Bob Slotter area?

A The Slotter Field, or the production on the Bob Slotter block is from the San Andres formation, the top of which is encountered at approximately 4,965 feet. The core analyses indicate that the average porosity is 16 percent, average permeability, 8.5 millidarcies, and water saturation approximately 30 percent; the produced crude, 32 degree API gravity crude, and the initial bottomhole pressure 1,720 PSI, and the field is producing from a solution gas drive mechanism.

Q How do these characteristics in the Slotter Field compare with the West Lovington-San Andres Pool?

A Both of these fields, it is apparent, are producing under similar conditions, and the formation characteristics from both fields are similar.

Q Have you prepared some pool characteristics?



A Yes, I have.

Q Are those set forth in Exhibit No. 23?

A Yes, they are. Exhibit No. 23 is a tabulation of the formation characteristics for the West Lovington and the Slotter Fields. The formation in both fields is the San Andres. The depth in the West Lovington is 4,750 feet, whereas in the Slotter it is 4,965 feet. The average net pay thickness in the West Lovington is 46 feet, and average net pay in the Slotter, 40 feet. The average porosity is 8.4 percent in the West Lovington and 13 percent in the Slotter. The average permeabilities, 8.65 millidarcies in the West Lovington, 8.5 millidarcies in the Slotter. Water saturation 25 percent in the West Lovington, and 30 percent in the Slotter. API gravity of the crude is 34 degrees in the West Lovington, and 32 degrees in the Slotter. The initial reservoir pressure in the West Lovington was 1,800 PSI, and in the Slotter was 1,720 PSI. The type of drive in both fields is a solution gas drive mechanism. It can be seen that these fields do have similar characteristics.

Q Mr. Black, can you give any of the history concerning the Bob Slotter Field waterflood?

A Yes, sir. The water injection began in the pilot waterflood March 11, 1959, and as of August 1, 1961 approximately 4,700,000 barrels of water had been injected into the ten injection wells. The gas-oil ratio of the wells in the pilot area has decreased from 4,100 cubic feet to 950 cubic feet per barrel; water



production has not shown any indication of breakthrough or has not shown any trend of increasing in any of the 22 producing wells. Therefore, it is apparent that this San Andres formation is being successfully waterflooded.

Q Will you refer to what has been marked Exhibit No. 24, and explain that, please?

A Exhibit 24 is the performance history of the Bob Slotter pilot waterflood, and this is since injection commenced in 1959. The upper curve is the gas-oil ratio curve which indicates the gas-oil ratio has declined from a maximum of 4,100 cubic feet per barrel to 950 cubic feet per barrel in July, 1961. The daily water injected has ranged between five and six thousand barrels of water per day. The first of 1961 this water injection was reduced to three thousand barrels a day. However, in May of 1961 water injection began increasing again, and in July, 1961, we injected approximately seven thousand barrels per day into the ten wells. The daily oil production has increased from 380 barrels per day to approximately 600 barrels per day. This daily oil production, this increase, is due primarily to the adoption of a net gas-oil ratio rule and the elimination of high gas-oil ratio penalties on the wells in the pilot area. Most of the wells that were converted to injection wells were capable of producing top allowable and, therefore, had top allowable transferred to the producing wells, and this increase in production cannot actually be attributed to the increase in productivity of the wells. However, we feel that



the capability of each of these wells to produce has increased since waterflood was initiated. The cumulative water injection is shown to be 4,700,000 barrels, and the cumulative oil production since waterflood began is 420,000 barrels.

Q Does this performance history prove that this is a successful waterflood project?

A It is believed that the success in reducing the gas-oil ratio and the fact that we have not experienced any water breakthrough or any trend of an increased water production, that this is believed to be evidence that this San Andres formation is being successfully waterflooded in this pilot area.

Q Do you have every reason to believe that your proposed waterflood in the West Lovington and San Andres Pool will be equally successful?

A Yes, sir, we feel the West Lovington Pool is of similar characteristics and, therefore, a waterflood program in this field should be as successful as the one being conducted in the Slotter Field.

Q Mr. Black, are you familiar with any other San Andres waterflood in West Texas or in New Mexico?

A Yes, sir, in August, 1961, an article was published in the Journal of Petroleum Technology. This was a formal report on the history of the Welch Field, San Andres pilot waterflood, written by C. E. Hendrickson of Cities Service Petroleum Company. This waterflood is located in Dawson County, in West Texas. This



is a pilot waterflood and has been in operation for approximately five years. The Welch pilot waterflood was initiated in 1955 and in 1960 it consisted of one forty-acre five-spot, latter part of 1960, first part of 1961 the pilot waterflood had been expanded to include the majority of the Welch Field. The primary production on the forty-acre tract, prior to injection, was 61,225 barrels. At the time water injection was commenced the 40 acres was producing ten barrels of oil per day. The production since injection, as of November, 1960, was 244,923 barrels. It can be seen that recovery since waterflood operations were started is approximately four times what it was under primary operations. The core analysis indicates that the pay zone has an average porosity of 9.94 percent, average permeability, 6.3 millidarcies. This compares to the other San Andres formations in the West Texas-New Mexico area, also compares to the West Lovington pool. The connate water saturation, 23 percent, pay zone encountered at approximately 4,900 feet.

Q Do you expect the subject proposed waterflood program to be as successful as the waterflood in the Welch Field?

A It is not anticipated that the West Lovington Field will respond that favorably; however, it is not impossible. There is a considerable lack of basic data in the West Lovington Field and, therefore, it is impossible to actually calculate the amount of oil to be recovered. However, based on performance of other San Andres waterfloods in the West Texas and New Mexico area, it is believed that the West Lovington Field should recover at least equal to or



possible in excess of what it will recover under primary production.

Q Can you give an estimate as to the number of secondary recovery projects there are in the San Andres formation in West Texas and in New Mexico, Southern New Mexico?

A Yes, sir, to the best of my knowledge at this time there are 40 secondary recovery projects being conducted in the West Texas and Southern New Mexico area in San Andres reservoirs. Twenty of these projects are waterflood projects and 20 are gas injection projects. These 40 projects are being conducted in 19 separate San Andres reservoirs in the area.

Q From your studies of the various waterfloods in the San Andres formation, is it your opinion that a pool-wide waterflood program can be successfully initiated from the beginning without first resorting to a pilot flood program?

A Yes, sir, the performance history to date, from the San Andres waterfloods in the West Texas and New Mexico area indicate that the San Andres formation can be waterflooded. I would like to state that none of these San Andres waterfloods, to my knowledge, have been carried so far as depletion. However, these San Andres waterfloods in their early stages are behaving very similarly to what we have encountered in sand waterfloods. Therefore, we feel the San Andres reservoir can be waterflooded and should obtain similar results to what are being obtained from a sand formation. Therefore, we believe a pilot is not necessary at this time.

Q What, in your opinion, are the advantages, if any, of



initiating a pool-wide flood program rather than a pilot project?

A Well, as stated previously, it is believed the West Lovington reservoir will be susceptible to waterflood operations, and in view of the other successful waterflood operations in the area it is believed that a pilot is not necessary. If a pilot flood is initiated and then you wait for a response in offset producing wells before conversion to injection, the period of conversion to injection can extend over possibly a two or three-year period. As previously stated, this well is in an advanced stage of depletion, the stripper stage, with a very low daily oil production per well, and this delay in converting wells to injection and obtaining a response, and an increase in production, could mean that possibly some wells would have to be operated at a loss unless their production could be increased by waterflood operations.

Q Is it your opinion that a greater oil recovery can be had by pool-wide basis rather than on a pilot basis?

A Why, yes, we believe that the pool-wide basis is favorable in that we can convert the wells to injection and it is more economically attractive to obtain an increase in production from the field in a shorter period of time rather than a prolonged period of time.

Q Have you any further statements to make at this time?

A One last statement I would like to make: It is the opinion of all the operators in the West Lovington Pool, as expressed in the Operators' Committee meeting, that the San Andres reservoir can



be successfully waterflooded and the waterflood operations should be initiated on a pool-wide basis. It has been found that the operations are economically attractive and the West Lovington unit is being formed for the primary purpose of conducting secondary recovery operation. It is believed unitized operations will result in the most economic recovery of the secondary oil and will result in the most efficient depletion of the reservoir and also result in the greatest ultimate recovery from this reservoir.

Q Were Exhibits 1 through 24 prepared by you or by the Committee, or under your or its direction?

A Yes, they were.

MR. WHITE: At this time we offer Exhibits 1 through 24.

MR. NUTTER: Texaco's Exhibits 1 through 24 will be admitted into evidence.

MR. WHITE: That concludes our testimony on direct.

MR. NUTTER: Does anybody have any questions?

CROSS EXAMINATION

BY MR. MORRIS:

Q Mr. Black, have you started signing up your working interests and royalty interests in this unit yet?

A No, sir, as explained previously, the Unit Agreement has been submitted to the Director of the U.S.G.S. for approval. It is anticipated that if any changes are made, possibly there might be a few minor word changes in the agreement --

Q It would be minor?



A Yes, minor word changes -- if the agreement had been ratified and the changes made they would have to be ratified again. Therefore, no operators have actually ratified; however, we have received tentative approval and don't anticipate difficulty in obtaining ratification once it has been approved by the U.S.G.S. and Commission.

Q Do you have particular portions of the agreement in mind that you might intend to change?

A No, sir, we don't. We don't anticipate any changes. However, from the experience other people have had in obtaining agreements, and general experience, it is believed possibly there could be a few minor word changes in the agreement.

Q Nothing substantial that you would have to come back and ask for our approval all over?

A No, we don't. We plan, at the time the Unit Agreement has been ratified, on submitting a copy as ratified, to the Commission so that you will have a final copy of the agreement.

BY MR. NUTTER:

Q Mr. Black, did you state that in calculating your gross acre feet you took your pay down to the water-oil contact?

A Yes, we did, across the top of the San Andres formation as determined by the structure map, and the oil-water contact of minus 1200 feet.

Q Have all of the operators agreed to the allocation formula and the participation factors?



A Yes, we have obtained tentative approval from all operators on the participation formula. It is believed by them there is an equitable representation of their interests in the secondary project.

Q Has the U. S. Geological Survey gone over the formula and participation factor?

A It has been reviewed in Roswell, and received favorable approval there, and has been submitted to the U.S.G.S. in Washington for their final approval.

Q But the Roswell Office agrees with the participation formula?

A Yes, they do.

Q Has the State Land Commission given tentative approval?

A Yes, a copy of the agreement has been submitted to that office and received tentative approval.

Q Are all producing wells within the pools included?

A Yes, sir, 59 wells drilled at one time and another that production was obtained from. One of these wells was plugged after it produced approximately five to six hundred barrels. This well is not included in the unit, but all 58 producing wells and the four undeveloped locations are included.

Q Have you calculated how much the maximum allowable will be under Rule 107?

A Yes, sir, assuming that we would have 62 wells producing a top allowable of 42 barrels per day we would have a maximum



allowable of 2,604 barrels per day.

Q What is your estimate of the length of time, after injection commences, before you will receive this maximum?

A We expect fill-up to occur anywhere between twelve and eighteen months. We should start obtaining a slight increase in production somewhere between six and twelve months, and sometime between twelve and eighteen months should reach the maximum allowable of 2,604 barrels per day.

Q With inverted nine-spot you will have response in the four wells directly offsetting the injection well prior to the time the ones in the field respond?

A Yes, sir, we anticipate that.

Q So you haven't actually achieved fill-up at the time you get your first response?

A No, sir, it has been our experience, and I believe other operators' experience, that you do get an increase in production prior to actual fill-up of the reservoir voidage.

Q What will be your expected injection rate per injection well?

A After fill-up has been achieved we expect a maximum of 600 barrels per day. If we matched withdrawals, which would be top allowable, this would be 145 barrels of water per well per day. However, we realize there will be a certain amount of injected water lost due to pattern inefficiency, and lost outside of it, so therefore, a maximum of 600 barrels has been established, and we



feel the injection rate, between 550 to 600 barrels per day.

Q When you are working towards fill-up, what will be the injection rate?

A Injection of 20,000 barrels a day, into 18 wells, a little better than a thousand a day.

Q Have you drilled your water supply well yet?

A No, we have not.

Q I notice on Exhibit No. 1, Mr. Black, that the surface pipe in these wells is set anywhere from 219 feet on down to better than 300 feet, and you mention that your water supply well would be producing from 250 feet?

A Two hundred fifty feet.

Q Is the surface pipe in each of these wells, particularly the ones where it is shallower, 219 and 220, is that set below the fresh water in that particular area?

A Due to the fact that this field was drilled in 1944, the majority of it, and logs are not available on the wells, we are unable to determine whether, in all cases, this surface pipe does protect the fresh water.

Q You also give the amount of cement used on surface pipe; was this circulated cement?

A Our records, in a lot of cases, did not indicate whether cement was circulated or not. However, this volume should be sufficient to circulate cement on the surface casing.

Q In any event, you will be injecting down tubing under a



packer?

A Yes, we will, and prior to injection the casing will be tested and some form of inhibited water placed behind the tubing, inside the casing.

Q Now, some of the wells in here are completed open hole, and others completed with various perforated intervals. Will any of the injection wells be open hole?

A Yes, sir, most of them will. All of the wells in the field were completed open hole with the exception of several of the Humble wells. I didn't have those wells listed, but certain of the Humble wells were perforated, and the rest of them are open hole so, therefore, some of the injection wells, the majority of the injection wells, will be open hole.

Q Will this present any problem in trying to get water in specific sands?

A We don't anticipate any problem. However, if we are not obtaining response we expect various surveys will be run, and if we find water going in formations other than where we would like it to, I am sure that at that time some type of program will be initiated to remedy this situation.

Q You stated that you expected the secondary recovery to about equal primary recovery, and according to your Exhibit No. 9 the field to date has produced 6.8 million barrels?

A Yes, sir.

Q So you expect another 6.8, possibly 7 million barrels?



A Yes, sir, ultimate primary recovery, seven million barrels; secondary recovery will be equal to, or possibly in excess, of this number.

Q You used 25 percent water saturation?

A For any calculation purposes, yes, we did.

Q There is only core information available on one well?

A Core data available on one well in the field.

MR. NUTTER: I believe that is all. Thank you.

Any further questions of Mr. Black? He may be excused. Do you have anything further, Mr. White?

MR. WHITE: That concludes our testimony.

MR. NUTTER: Does anyone have anything they wish to add?

MR. JONES: Carl Jones, representing Phillips Petroleum Company. Phillips expects to execute the Unit Agreement as it has been submitted here, and it concurs with Texaco's recommendations and requests approval of the Commission. Thank you.

MR. BRATTON: Howard Bratton, on behalf of Humble Oil & Refining. Humble is one of the principal operators in the West Lovington Field and favors the institution of a unitized waterflood operation in the field and, as has been stated here, Humble, along with the other operators, has agreed to the allocation formula. We have not been tendered the final Unit Agreement form, or unit operating agreement form for execution; subject, of course, to examining those and approval and acceptance of those, we support the institution of the unitized waterflood operation.



MR. NUTTER: Any one else?

MR. MORRIS: Mr. Examiner, I have letters and telegrams from operators in the proposed unit concurring with this application today. These telegrams -- I have a telegram, Fred Turner, Jr., Socony Mobil Oil Company, Tidewater Oil Company, and a letter from Pan American Oil Company, stating their concurrence.

MR. NUTTER: Is there anything further in Case 2385? We will take the case under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JUNE PAIGE, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at 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 4th day of October, 1961.

June Paige
Notary Public - Court Reporter

My commission expires:

May 11, 1964.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2385 heard by me on 10/25/61 1961.

[Signature], Examiner
New Mexico Oil Conservation Commission

DEARNLEY-MEIER REPORTING SERVICE, Inc.

PHONE CH 3-6691

ALBUQUERQUE, NEW MEXICO



I N D E XWITNESSPAGE

CHARLES ROBERT BLACK

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Cross Examination by Mr. Nutter

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UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION
OF THE
WEST LOVINGTON UNIT AREA
COUNTY OF LEA
STATE OF NEW MEXICO

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Exhibit "A" (Map of Unit Area)

Exhibit "B" (Schedule of Ownership)

UNIT AGREEMENT
FOR THE DEVELOPMENT AND OPERATION OF THE
WEST LOVINGTON UNIT
LEA COUNTY, NEW MEXICO

THIS AGREEMENT, entered into as of the 1st day of May, 1961, by and between the parties subscribing, ratifying or consenting hereto, and herein referred to as "parties hereto",

WITNESSETH: That,

WHEREAS, the parties hereto are the owners of working, royalty or other oil or gas interests in the Unit subject to this Agreement; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec. 3, Chap. 88, Laws 1943 as amended by Sec. 1 of Chap. 162, Laws of 1951, Chap. 7, Art. 11, Sec. 39, N.M.S. 1953 anno) to consent to or approve this Agreement on behalf of the State of New Mexico, insofar as it covers and includes lands and mineral interests of the State of New Mexico; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec. 3, Chap. 88, Laws of 1943, as amended by Sec. 1, Chap. 162, Laws of 1951, Chap. 7, Art. 11, Sec. 41, N.M.S. 1953 anno) to amend with the approval of the lessee, any oil and gas lease embracing State lands so that the length of the term of said lease may coincide with the term of such unitized development and operation of State lands; and

WHEREAS, the Oil Conservation Commission of the State of New Mexico is authorized by law (Chap. 72, Laws of 1935, as amended by Chap. 193, Laws of 1937, Chap. 166, Laws of 1941, and Chap. 168, Laws of 1949) to approve this Agreement, and the conservation provisions hereof; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, (41 Stat. 437, as amended, 30 U.S.C. Sections 181 et seq.) authorizes Federal lessees and their representatives to unite with each other or jointly or separately with others in collectively adopting and operating a co-operative or unit plan of development or operation of any oil or gas

pool, field or like area or any part thereof for the purpose of more properly conserving the natural resources thereof whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS, the parties hereto hold sufficient interests in the West Lovington Unit covering the Land hereinafter described to give reasonably effective control of operation therein; and

WHEREAS, it is the purpose of the parties hereto, to enable institution and consummation of secondary recovery operations, conserve natural resources, prevent waste and secure the other benefits obtainable through development and operation of the area subject to this Agreement under the terms, conditions and limitations herein set forth.

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this Agreement their entire respective interests in the below defined Unit Area, and agree severally among themselves as follows:

SECTION 1. ENABLING ACT AND REGULATIONS: The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid, pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder and valid, pertinent and reasonable regulations hereafter issued thereunder are accepted and made a part of this Agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this Agreement; and as to non-Federal lands, the oil and gas operating regulations in effect as of the effective date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the State in which the non-Federal land is located, are hereby accepted and made a part of this Agreement.

SECTION 2. UNIT AREA AND DEFINITIONS: For the purpose of this Agreement, the following terms and expressions as used herein shall mean;

(a) "Unit Area" is defined as those lands specified on Exhibit "A" hereof, and such land is hereby designated and recognized as constituting the Unit Area; the lands described in said Exhibit "A" are described as follows, to-wit:

Township 16 South, Range 36 East, New Mexico Principal Meridian

Section 33: SW/4 SW/4

Township 17 South, Range 36 East, New Mexico Principal Meridian

Section 3: W/2 SW/4

Section 4: Lots 2, 3, 4, S/2 N/2, S/2

Section 5: Lots 1, 2, S/2 N/2, S/2

Section 6: SE/4 NE/4, SE/4 SW/4, SE/4

Section 7: Lots 1, 2, E/2 NW/4, NE/4, N/2 SE/4

Section 8: N/2, N/2 SW/4, NW/4 SE/4

Section 9: N/2 NW/4, NW/4 NE/4

containing 2,472.21 acres, more or less, in Lea County, New Mexico.

(b) "Commissioner" is defined as the Commissioner of Public Lands of the State of New Mexico.

(c) "Commission" is defined as the Oil Conservation Commission of the State of New Mexico.

(d) "Director" is defined as the Director of the United States Geological Survey.

(e) "Secretary" is defined as the Secretary of the Interior of the United States of America.

(f) "Department" is defined as the Department of the Interior of the United States of America.

(g) "Supervisor" is defined as the Oil and Gas Supervisor of the United States Geological Survey.

(h) "Upper San Andres Formation" is defined and shall mean that heretofore established underground reservoir, the top of which is found at 4,727 feet, and the base of which is found at 5,160 feet, on the Gamma Ray log of Cities Service Petroleum Company's State of New Mexico "AU" Lease, Well No. 1, located in the NW/4 of the NW/4 of Section 10, T-17-S, R-36-E, insofar as the same lies within the Unit Area.

(i) "Unitized Formation" is defined as the portion of the Upper San Andres Formation effectively committed to this Agreement.

(j) "Unitized Substances" is defined as and shall mean all oil, gas, gaseous substances, sulphur contained in gas, condensate, distillate and all associated and constituent liquids or liquefiable hydrocarbons within or produced from the Unitized Formation.

(k) "Working Interest" is defined as the right to search for, produce and acquire Unitized Substances whether held as an incident of ownership of mineral fee simple title, under an oil and gas lease, or otherwise held.

(l) "Working Interest Owner" is defined as and shall mean any party hereto owning a Working Interest, including a carried working interest owner, holding an interest in Unitized Substances by virtue of a lease, operating agreement, fee title or otherwise, which interest is chargeable with and obligated to pay or bear, either in cash or out of production, or otherwise, all or a portion of the cost of drilling, developing and producing the Unitized Substance from the Unitized Formation and operating thereof hereunder.

(m) "Royalty Interest" or "Royalty" is defined as an interest other than a Working Interest in or right to receive a portion of the Unitized Substances or the proceeds thereof and includes the royalty interest reserved by the lessor by an oil and gas lease and any overriding royalty interest, oil payment interest, net profit contracts, or any other payment or burden which does not carry with it the right to search for and produce Unitized Substances.

(m) "Royalty Owner" is defined as and shall mean the owner of a Royalty Interest.

(n) "Unit Operating Agreement" is defined as and shall mean any agreement or agreements (whether one or more) entered into (separately or collectively) by and between the Unit Operator and the Working Interest Owners as provided in Section 10, infra, and shall be styled "Unit Operating Agreement, West Lovington Unit, Lea County, New Mexico".

(o) "Paying Quantities" is defined as production of Unitized Substances in quantities sufficient to pay for the cost of producing same from wells on the unitized land.

(p) "Unit Manager" is defined as the person or corporation appointed by the Working Interest Owners to perform the duties of the Unit Operator until the selection and qualification of a successor Unit Operator as provided for in Section 9 hereof.

(q) "Adjusted Cumulative Oil Production" is defined as that cumulative volume of oil produced and saved from each 40-acre spacing unit upon which a producing well has been completed prior to September 1, 1959, insofar as such production was reported to the Commission. For each 40-acre spacing unit upon which a well has not been completed or was completed subsequent to September 1, 1959, which are included within the Unit Area, "Adjusted Cumulative Oil Production" is defined as that value assigned to each of said spacing units by the Working Interest Owners.

(r) "Gross Acre Feet" is defined as the volume of Upper San Andres formation underlying each 40-acre spacing unit as determined by the Working Interest Owners.

(s) "Current Oil Production" is defined as that oil produced and saved during the first eight months of 1959, from each 40-acre spacing unit upon which a producing well was completed prior to September 1, 1959. For each 40-acre spacing unit upon which a well was completed subsequent to September 1, 1959, "Current Oil Production" is defined as eight times that oil produced and saved during the 30-day period after 60 days of oil production following completion.

(t) "Surface Acres" is defined as the number of acres committed to this Agreement based upon computations on the surface of the earth from courses and distances shown on the last approved public-land survey as of the effective date hereof.

(u) "Tract" means each parcel of land described as such and given a Tract number in Exhibit "B"

SECTION 3. EXHIBITS: Exhibit "A" attached hereto is a map showing, to the extent known to the Unit Operator, the Unit Area and the boundaries and identity of tracts and leases in said Unit Area. Exhibit "B" attached hereto is a schedule showing, to the extent known to the Unit Operator, the acreage comprising each tract, percentage ownership of each Working Interest Owner in each tract, and the percentage of participation each tract has in the Unit Area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown in said map or schedule as owned by such

party. Exhibits "A" and "B" shall be revised by the Unit Operator whenever changes render such revision necessary, and at least two copies of such revision shall be filed with the Commissioner, and not less than six copies thereof shall be filed with the Supervisor.

SECTION 4. EXPANSION: The above described Unit Area may when practicable be expanded to include therein any additional tract or tracts regarded as reasonably necessary or advisable for the purposes of this Agreement to conform with the purposes of this Agreement. Such expansion shall be effected in the following manner:

(a) The Working Interest Owner or owners of a tract or tracts desiring to bring such tract or tracts into this Unit, shall file an application therefor with Unit Operator requesting such admission.

(b) Unit Operator shall circulate a notice to each Working Interest Owner of the proposed expansion, setting out the basis for admission, the unit participation to be assigned to such tract or tracts, and other pertinent data. After negotiation (at Working Interest Owners' meeting or otherwise) if 90 percent of the Working Interest Owners (on the basis of unit participation) have agreed to such tract or tracts being brought into the Unit, then Unit Operator shall:

(1) Prepare a notice of proposed expansion describing the contemplated changes in the boundaries of the Unit Area, the reason therefor, the basis for admission of the additional tract or tracts, the unit participation to be assigned thereto and the proposed effective date thereof, preferably the first day of a month subsequent to the date of notice; and

(2) Deliver copies of said notice to the Commissioner, the Director, each Working Interest Owner (mailing copy of such notice to the last known address of each such Working Interest Owner) and to the lessee and lessor whose interests are proposed to be committed, advising such parties that thirty (30) days will be allowed for submission to the Unit Operator of any objection to such proposed expansion; and

(3) File, upon the expiration of said thirty (30) day period as set out in (2) immediately above and provided that objections of not more than 10 percent of the Working Interest Owners have been filed thereto, with the Commissioner, Director and the Commission the following: (a) Comprehensive statement as to mailing such notice of expansion; (b) An application for such expansion; and (c) An instrument containing the appropriate joinders in compliance with the participation requirements of Section 14, *infra*.

The expansion shall, after due consideration of all pertinent information and upon approval by the Commissioner, the Director and the Commission, become effective as of the date prescribed in the notice thereof or on such other date as set by the Commissioner, the Director and the Commission in the order or instrument approving such expansion.

SECTION 5. CONTRACTION: When practicable, the Unit Area shall be contracted to exclude land not effectively committed to this Unit Agreement whenever such contraction is necessary or advisable to conform with the purposes of this Agreement. Such contraction should be effected in the following manner:

(a) Unit Operator, with concurrence of at least 80 percent of the Working Interest Owners, on the basis of unit participation, or on demand of the Director, or on demand of the Commissioner, after preliminary concurrence by the Director, shall prepare a notice of contraction describing the contemplated changes in the boundaries of the Unit Area, the reasons therefor, and the proposed effective date thereof, preferably the first day of a month subsequent to the date of notice.

(b) Said notice shall be delivered to the Supervisor, Commission, and to the Commissioner, and copies thereof mailed to the last known address of each Working Interest Owner, lessee, and Royalty Owner whose interests are affected, advising that 30 days will be allowed for submission to the Unit Operator of any objections.

(c) Upon expiration of the 30-day period provided in the preceding item (b) hereof, Unit Operator shall file with the Supervisor, Commission, and the Commissioner, a comprehensive statement as to mailing of the notice of contraction and a copy of any objections thereto which have been filed with the Unit Operator, together with an application in sufficient number, for approval of such contraction.

(d) After due consideration of all pertinent information, the contraction, upon approval by the Commissioner, Commission, and the Director, shall become effective as of the date prescribed in the notice thereof.

SECTION 6. UNITIZED LAND AND UNITIZED SUBSTANCES: All Unitized Substances in all of the hereinabove described and subsequently admitted land effectively committed to this Agreement, insofar only as the same may be found in the Unitized Formation, together with the surface rights of ingress and egress, are unitized under the terms of this Agreement and said land shall constitute land referred to herein as "Unitized Land" or "Land Subject to this Agreement"

Nothing herein shall be construed to unitize, pool, or in any way affect the oil, gas and other minerals contained in or that may be produced from any formation other than the Unitized Formation.

SECTION 7. UNIT OPERATOR: TEXACO Inc., a Delaware corporation, is hereby designated as Unit Operator, and by signing this instrument as Unit Operator it agrees and consents to accept the duties and obligations of Unit Operator for the operation, development and production of Unitized Substances as herein provided. Whenever reference is made

herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as an owner of interests in Unitized Substances, and the term "Working Interest Owner" when used herein shall include or refer to Unit Operator as the owner of a Working Interest when such an interest is owned by it.

SECTION 8. RESIGNATION OR REMOVAL OF UNIT OPERATOR: Unit Operator shall have the right to resign at any time, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights as such for a period of six (6) months after written notice of intention to resign has been given by Unit Operator to all Working Interest Owners, the Commissioner and the Director, unless a new Unit Operator shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

The resignation of Unit Operator shall not release Unit Operator from any liability for any default by it hereunder occurring prior to the effective date of its resignation.

The Unit Operator may, upon default or failure in the performance of its duties or obligations hereunder, be subject to removal by 75 percent of the committed Working Interest Owners (on the basis of Unit participation) exclusive of the Working Interest Owner who is the Unit Operator. Such removal shall be effective upon notice thereof to the Commissioner and the Director.

In all such instances of effective resignation or removal, until a successor to Unit Operator is selected and approved as hereinafter provided, the Working Interest Owners shall be jointly responsible for the performance of the duties of the Unit Operator and shall, not later than thirty (30) days before such resignation or removal becomes effective, appoint a Unit Manager to represent them in any action to be taken hereunder.

The resignation or removal of Unit Operator under this Agreement shall not terminate its right, title or interest as the owner of a Working Interest or other interest in Unitized Substances, but upon the

resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all equipment, books, and records, materials, appurtenances and any other assets, used in conducting the Unit operations and owned by the Working Interest Owners (including any and all data and information which it might have gained or assembled by reason of its operation of the Unit Area) to the new duly qualified successor Unit Operator or to the Unit Manager if no such new Unit Operator is elected, to be used for the purpose of conducting Unit operations hereunder. Nothing herein shall be construed as authorizing removal of any material, equipment and appurtenances needed for the preservation of any wells. Nothing herein contained shall be construed to relieve or discharge any Unit Operator who resigns or is removed hereunder for any liability or duties accruing or performable by it prior to the effective date of such resignation or removal.

SECTION 9. SUCCESSOR UNIT OPERATOR: Whenever the Unit Operator shall tender its resignation as Unit Operator or shall be removed as hereinabove provided, the Working Interest Owners shall by affirmative vote of at least 65 percent of their voting interests, based upon the percentages of participation assigned to tracts in the Unit Area, select a successor Unit Operator, provided, however, that should any Working Interest Owner own a voting interest of more than 35 percent, the vote of said party shall not serve to disapprove the selection of a new Unit Operator approved by 80 percent or more of the voting interests of the remaining Working Interest Owners, and provided further that the Unit Operator shall not vote to succeed himself. Such selection shall not become effective until (a) a Unit Operator so selected shall accept in writing the duties and responsibilities of Unit Operator, and (b) the selection shall have been approved by the Commissioner and the Director. If no successor Unit Operator or Unit Manager is selected and qualified as herein provided, the Commissioner and the Director, at their election, may declare this Agreement terminated.

SECTION 10. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT: Costs and expenses incurred by Unit Operator in conducting Unit operations hereunder shall be paid, apportioned among and borne by the Working Interest Owners in accordance with the Unit Operating Agreement.

Such Unit Operating Agreement shall also provide the manner in which the Working Interest Owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases or other independent contracts and such other rights and obligations as between Unit Operator and the Working Interest Owners as may be agreed upon by the Unit Operator and the Working Interest Owners; however, no such Unit Operating Agreement shall be deemed either to modify any of the terms and conditions of this Unit Agreement or to relieve the Unit Operator of any right or obligation established under this Agreement, and in case of any inconsistency or conflict between this Agreement and the Unit Operating Agreement, this Agreement shall prevail. Two true copies of any Unit Operating Agreement executed pursuant to this Section shall be filed with the Commissioner and three true copies thereof shall be filed with the Supervisor, prior to approval of this Agreement.

SECTION 11. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR: Except as otherwise specifically provided herein, the exclusive right, privilege and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting for, producing, storing, allocating and distributing the Unitized Substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Acceptable evidence of title to said rights shall be deposited with said Unit Operator, and together with this Agreement, shall constitute and define the rights, privileges and obligations of Unit Operator. Nothing herein, however, shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that under this Agreement the Unit Operator, in its capacity as Unit Operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified,

SECTION 12. PLAN OF OPERATIONS: It is recognized and agreed by the parties hereto that all of the land subject to this Agreement is reasonably proved to be productive of Unitized Substances in paying quantities and that the object and purpose of this Agreement is to formulate and to put into effect a secondary recovery project in order to effect additional recovery of Unitized Substances, prevent waste and conserve

natural resources. The parties hereto agree that the Unit Operator may, subject to the consent and approval of a plan of operation by the Working Interest Owners, the Supervisor, the Commission, and the Commissioner, inject into the Unitized Formation, through any well or wells completed therein, brine, water, air, gas, oil, liquefied petroleum gas, and any other substance or a combination of any of said substances, whether produced from the Unit Area or not, and that the location of input wells and the rates of injection therein and the rate of production shall be governed by standards of good geologic and petroleum engineering practices and conservation methods. After commencement of secondary operations, Unit Operator shall furnish the Commission, the Commissioner, and the Supervisor monthly, injection and production reports for each well in the Unit. The Working Interest Owners, the Supervisor, the Commission, and the Commissioner, shall be furnished periodical reports on the progress of the plan of operation and any revisions or changes thereto; provided however, that any major revisions of the plan of operation involving a basic deviation from the initial plan of operation shall be subject to the consent and approval of the Working Interest Owners, the Supervisor, the Commission, and the Commissioner.

The initial plan of operation shall be filed with the Supervisor, the Commission, and the Commissioner concurrently with the filing of this Unit Agreement for final approval. Said initial plan of operation and all revisions thereof shall be as complete and adequate as the Supervisor, the Commission, and the Commissioner may determine to be necessary for timely operation consistent herewith. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of operation.

Notwithstanding anything to the contrary herein contained, the Unit Operator shall commence secondary recovery operations on the Unit Area within six (6) months after the effective date of this Agreement, or any extension thereof approved by the Commission, the Commissioner and the Director, or this Agreement shall terminate automatically, in which latter event Unit Operator shall notify all interested parties. After such operations are commenced, Unit Operator shall carry on such operations as would a reasonably prudent operator under the same or similar circumstances.

SECTION 13. TRACT PARTICIPATION: In Exhibit "B" attached hereto, there are listed and numbered the various tracts within the Unit Area and set forth opposite each tract is a figure which represents the percentage of participation allocated to each tract in the Unit Area calculated on 100 percent ^{tract}/commitment. The participation percentage of each tract was determined as follows:

$$\begin{aligned} \text{Percentage Participation of Each Tract} &= 50\% \left(\frac{\text{Tract Adjusted Cumulative Oil Production}}{\text{Unit Area Adjusted Cumulative Oil Production}} \right) \text{ plus} \\ &\quad 25\% \left(\frac{\text{Tract Gross Acre Feet}}{\text{Unit Area Gross Acre Feet}} \right) \text{ plus} \\ &\quad 15\% \left(\frac{\text{Tract Surface Acres}}{\text{Unit Area Surface Acres}} \right) \text{ plus} \\ &\quad 10\% \left(\frac{\text{Tract Current Oil Production}}{\text{Unit Area Current Oil Production}} \right) \end{aligned}$$

However, if the Unit Agreement is approved with less than 100 percent tract commitment, said participation percentage shall be revised to fit the commitment status as of the effective date hereof, and thereafter, as needed pursuant to Section 15 (Allocation of Unitized Substances).

SECTION 14. TRACTS QUALIFIED FOR UNIT PARTICIPATION: On and after the effective date hereof the tracts within the Unit Area which shall be entitled to participation in the production of Unitized Substances therefrom shall be those tracts within the Unit Area and more particularly described in said Exhibit "B" that are qualified as follows:

(a) Each and all of those tracts as to which Working Interest Owners owning 100% of the Working Interest in said tract and Royalty Owners owning 100% of the Royalty Interest in said tract have subscribed, ratified or consented to this Agreement; and

(b) Each and all of those tracts as to which Working Interest Owners owning not less than 95% of the Working Interest therein and Royalty Owners owning not less than 75% of the Royalty Interest therein have executed this Agreement, and in which the Working Interest Owners in said tract who have executed this Agreement have agreed to indemnify and hold harmless all other parties hereto, in a manner satisfactory to 85% of the Working Interest Owners qualified under (a), against any and all claims and demands that may be made by the nonjoining Working Interest Owners or Royalty Owners, or both, on account of the commitment and joinder of such tract to the Unit Agreement, and operation thereof under such conditions on the basis herein provided, and as to which 85% of the Working Interest Owners qualified under (a), exclusive of the Working Interest Owner submitting such tract, have approved the commitment of such tract to this Unit Agreement.

If, on the effective date of this Agreement, there is any tract or tracts which have not been effectively committed to or made subject to this Agreement by qualifying as above provided, then such tract or tracts shall not be entitled to participate hereunder. Unit Operator shall, when submitting this Agreement for final approval by the Commissioner and the Director, file therewith a schedule of those tracts which have been committed and made subject to this Agreement and are entitled to participate in the production from the Unit Area hereunder. Said schedule shall set forth opposite each such committed tract the lease number and assignment number, the owner of record of the lease, and the percentage participation of such tract which shall be computed according to the participation formula set out in Section 13 (Tract Participation) above. This schedule of participation shall be a part of Exhibit "B" and upon approval thereof by the Commissioner and the Director shall become a part of this Agreement and shall govern the allocation of production of Unitized Substances until a new schedule is filed and approved by the Commissioner and the Director.

SECTION 15. ALLOCATION OF UNITIZED SUBSTANCES: All Unitized Substances produced and saved (less, save and except any part of such Unitized Substances used in conformity with good operating practices on unitized land for drilling, operating, camp, and other production or development purposes and for pressure maintenance or unavoidable loss) shall be apportioned among and allocated to the committed tracts within the Unit Area in accordance with the respective tract participation effective hereunder during the respective periods such Unitized Substances were produced, as set forth in the schedule of participation in Exhibit "B". The amount of Unitized Substances so allocated to each tract, and only that amount, (regardless of whether it be more or less than the amount of the actual production of Unitized Substances from the well or wells, if any, on such tract) shall, for all intents, uses and purposes, be deemed to have been produced from such tract.

The Unitized Substances allocated to each tract shall be distributed among, or accounted for to the parties executing, consenting to or

ratifying this Agreement entitled to share in the production from such tract in the same manner, in the same proportions, and upon the same conditions, as they would have participated and shared in the production from such tracts, or in the proceeds thereof, had this Agreement not been entered into; and with the same legal force and effect.

No tract committed to this Agreement and qualified for participation as above provided shall be subsequently excluded from participation hereunder on account of depletion of Unitized Substances, and nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the joinder of any tract.

If the Working Interest and the Royalty Interest in any tract are divided with respect to separate parcels or portions of such tract and owned severally by different persons, the percentage participation assigned to such tract shall, in the absence of a recordable instrument executed by all owners and furnished to Unit Operator fixing the divisions of ownership, be divided among such parcels or portions in proportion to the number of surface acres in each.

The Unitized Substances allocated to each tract shall be delivered in kind to the respective Working Interest Owners and parties entitled thereto by virtue of the ownership of oil and gas rights therein or by purchase from such owners. Each Working Interest Owner and the parties entitled thereto shall have the continuing right to receive such production in kind at a common point within the Unit Area and to sell or dispose of the same as it sees fit. Each such party shall have the right to construct, maintain and operate all necessary facilities for that purpose on unitized land, provided the same are so constructed, maintained and operated as not to interfere with operations carried on pursuant hereto. Subject to Section 16 hereof, any extra expenditure incurred by Unit Operator by reason of the delivery in kind of any portion of the Unitized Substances shall be borne by the party receiving the same in kind. In the event any party hereto shall fail to take or otherwise adequately dispose of its proportionate share of the production from the Unit Area currently as and when produced, then so long as such conditions continue, Unit Operator, for the account and at the expense of such party and in order to avoid curtailing the operation of the Unit

Area, may sell or otherwise dispose of such production to itself or others on a day-to-day basis at not less than the prevailing market price in the area for like production, and the account of such party shall be charged therewith as having received such production. The net proceeds, if any, of the Unitized Substances so disposed of by Unit Operator shall be paid to the party entitled thereto.

Any party receiving in kind or separately disposing of all or any part of the Unitized Substances allocated to any tract, or receiving the proceeds therefrom if the same is sold or purchased by Unit Operator, shall be responsible for the payment of all Royalty on the lease or leases and tracts contributed by it and received into the Unit, and each such party shall hold each other party hereto harmless against all claims, demands and causes of action for such Royalty on the lease or leases and tracts contributed by it and received into the unitized land.

If, after the effective date of this Agreement, there is any tract or tracts that are subsequently committed hereto, as provided in Section 4 (Expansion) hereof, or any tract or tracts within the Unit Area not committed hereto as of the effective date hereof but which are subsequently committed hereto under the provisions of Section 31 (Nonjoinder and Subsequent Joinder), or if any tract is excluded from the Unit Area as provided for in Section 30 (Loss of Title), the schedule or participation as shown in Exhibit "B", subject to Section 13 (Tract Participation) or Section 31 (Nonjoinder and Subsequent Joinder), whichever is appropriate, shall be revised by the Unit Operator and distributed to the Working Interest Owners, the Commissioner, and the Director to show the new percentage participation of all the then effectively committed tracts; and the revised schedule, upon approval by the Commissioner and the Director, shall govern all the allocation of production from and after the effective date thereof until a new schedule is filed and approved by the Commissioner and the Director.

SECTION 16. ROYALTY SETTLEMENT: The State of New Mexico and the United States of America and all Royalty Owners who, under an existing contract, are entitled to take in kind a share of the substances pro-

duced from any tract unitized hereunder, shall continue to be entitled to such right to take in kind their share of the Unitized Substances allocated to such tract, and Unit Operator shall make deliveries of such Royalty share taken in kind in conformity with the applicable contracts, laws and regulations. Settlement for Royalty Interest not taken in kind shall be made by Working Interest Owners responsible therefor under existing contracts, laws and regulations, on or before the last day of each month for Unitized Substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any Royalty due under their leases, except that such Royalty shall be computed in accordance with the terms of this Unit Agreement.

If gas obtained from lands not subject to this Agreement is introduced into the Unitized Formation, for use in repressuring, stimulation of production or increasing ultimate recovery in conformity with a plan approved pursuant to Section 12 (Plan of Operations), a like amount of gas, less appropriate deductions for loss from any cause, may be withdrawn from the Unitized Formation, Royalty free as to dry gas but not as to the products extracted therefrom; provided such withdrawal shall be pursuant to such conditions and formulas as may be prescribed or approved by the Supervisor and the Commissioner; and provided further that such right of withdrawal shall terminate as of the effective date of termination of the Unit Agreement. If liquefied petroleum gases obtained from lands or formations not subject to this agreement be injected into the unitized land for the purpose of increasing ultimate recovery, which shall be in conformance with a plan first approved by the Supervisor and the Commissioner, part or all of such liquefied petroleum gases may be withdrawn royalty free pursuant to such conditions and formulas as may be prescribed or approved by the Supervisor and the Commissioner.

All Royalty due the State of New Mexico and the United States of America and the other Royalty Owners hereunder shall be computed and paid on the basis of all Unitized Substances allocated to the respective

tract or tracts committed hereto, in lieu of actual production from such tract or tracts.

Each Royalty Owner (other than the State of New Mexico and the United States of America) that executes this Agreement represents and warrants that it is the owner of a Royalty Interest in a tract or tracts within the Unit Area as its interest appears in Exhibit "B" attached hereto. If any Royalty Interest in a tract or tracts should be lost by title failure or otherwise in whole or in part, during the term of this Agreement, then the Royalty Interest of the party representing himself to be the owner thereof shall be reduced proportionately and the interest of all parties shall be adjusted accordingly.

SECTION 17. RENTAL SETTLEMENT: Rentals or minimum royalties due on leases committed hereto shall be paid by Working Interest Owners responsible therefor under existing contracts, laws and regulations, provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum royalty in lieu thereof, due under their leases. Rental for lands of the State of New Mexico subject to this Agreement shall be paid at the rate specified in the respective leases from the State of New Mexico. Rental or minimum royalty for lands of the United States of America subject to this Agreement shall be paid at the rate specified in the respective leases from the United States of America, unless rental or minimum royalty is waived, suspended, or reduced by law or by approval of the Secretary or his duly authorized representative.

SECTION 18. CONSERVATION: Operations hereunder and production of Unitized Substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by or pursuant to Federal and State laws and regulations.

SECTION 19. DRAINAGE: The Unit Operator shall take appropriate and adequate measures to prevent drainage of Unitized Substances from unitized land by wells on land not subject to this Agreement.

SECTION 20. LEASES AND CONTRACTS CONFORMED AND EXTENDED: The terms, conditions and provisions of all leases, subleases and other contracts relating to exploration, drilling, development or operation for

oil or gas on lands committed to this Agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise to remain in full force and effect, and the parties hereto hereby consent that the Secretary and the Commissioner, respectively, shall and by their approval hereof, or by the approval hereof by their duly authorized representatives, do hereby establish, alter, change or revoke the drilling, producing, rental, minimum royalty and royalty requirements of Federal and State leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this Agreement.

Without limiting the generality of the foregoing, all leases, subleases and contracts are particularly modified in accordance with the following:

(a) The development and operation of lands subject to this Agreement under the terms hereof shall be deemed full performance of all obligations for development and operation with respect to each and every part or separately owned tract subject to this Agreement, regardless of whether there is any development of any particular part of tract of the Unit Area, notwithstanding anything to the contrary in any lease, operating agreement or other contract by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling, producing or secondary recovery operations performed hereunder upon any tract of unitized lands shall be accepted and deemed to be performed upon and for the benefit of each and every tract of unitized land, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on land therein embraced.

(c) Suspension of drilling or producing operations on all unitized lands pursuant to direction or consent of the Commissioner and the Supervisor or their duly authorized representatives, shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every tract of unitized lands.

(d) Each lease, sublease, or contract relating to the exploration, drilling, development or operation for oil and gas which by its terms might expire prior to the termination of this Agreement, is hereby extended beyond any such term so provided therein, so that it shall be continued in full force and effect for and during the term of this Agreement.

(e) Any Federal lease for a fixed term of twenty (20) years or any renewal thereof or any part of such lease which is made subject to this Agreement shall continue in force beyond the term provided therein until the termination hereof. Any other Federal lease committed hereto shall continue in force beyond the term so provided therein or by law as to the committed land so long as such land remains committed hereto, or in the event actual drilling operations are commenced on unitized land, in accordance with the provisions of this Agreement, prior to the end of the primary term of such lease and are being diligently prosecuted

at that time, such lease shall be extended for two years and so long thereafter as oil or gas is produced in paying quantities in accordance with the provisions of the Mineral Leasing Act Revision of 1961

(f) Any lease embracing lands of the State of New Mexico, which is made subject to this Agreement, shall continue in force beyond the term provided therein as to the lands committed hereto until the termination hereof.

(g) Any lease embracing lands of the State of New Mexico having only a portion of its land committed hereto, shall be segregated as to that portion committed and that not committed, and the terms of such lease shall apply separately to such segregated portions commencing as of the effective date hereof. Provided, however, that notwithstanding any of the provisions of this Agreement to the contrary, such lease shall continue in full force and effect beyond the term provided therein as to all lands embraced in such lease if oil or gas is, or has heretofore been, discovered in paying quantities on some part of the lands embraced in such lease committed to this Agreement or, so long as a portion of the Unitized Substances produced from the Unit Area is, under the terms of this Agreement, allocated to the portion of the lands covered by such lease committed to this Agreement, or, at any time during the term hereof, as to any lease that is then valid and subsisting and upon which the lessee or the Unit Operator is then engaged in bona fide drilling, reworking, or secondary recovery operations on any part of the lands embraced in such lease, then the same as to all lands embraced therein shall remain in full force and effect so long as such operations are diligently prosecuted, and if they result in the production of oil or gas, said lease shall continue in full force and effect as to all of the lands embraced therein, so long thereafter as oil or gas in paying quantities is being produced from any portion of said lands.

(h) The segregation of any Federal lease committed to this Agreement is governed by the following provisions in the fourth paragraph of Sec. 17(b) of said Act of February 25, 1920, as amended by the Act of July 29, 1954, (68 Stat. 583, 585): "Any (Federal) lease hereafter committed to any such plan (unit) embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date of unitization; provided, however, that any such lease as to the nonunitized portion shall continue in force and effect for the term thereof but for not less than two years from the date of such segregation and so long thereafter as oil or gas is produced in paying quantities."

SECTION 21. MATHEMATICAL ERRORS: It is hereby agreed by all parties to this Agreement that Unit Operator is empowered to correct any mathematical errors which might exist in the pertinent exhibits to this Agreement upon approval of the Commissioner, and the Supervisor.

SECTION 22. COVENANTS RUN WITH LAND: The covenants herein shall be construed to be covenants running with the land with respect to the interest of the parties hereto and their successors in interest until this Agreement terminates, and any grant, transfer or conveyance of

interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee or other successor in interest. No assignment or transfer of any Working Interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer; and no assignment or transfer of any Royalty Interest subject hereto shall be binding upon the Working Interest Owner responsible therefor until the first day of the calendar month after said Working Interest Owner is furnished with the original, or acceptable photostatic or certified copy, of the recorded instrument of transfer.

SECTION 23. EFFECTIVE DATE AND TERM: This Agreement shall become binding upon each party who executes or ratifies it as of the date of execution or ratification by such party and shall become effective as of 7:00 o'clock a.m. of the first day of the month next following:

(a) The execution or ratification of this Agreement and the Unit Operating Agreement by Working Interest Owners owning a combined unit participating of at least 95 percent, and the execution or ratification of this Agreement by Royalty Owners owning a combined interest of at least 75 percent of the Royalty Interest, in said Unit Area; and

(b) The approval of this Agreement by the Commissioner, the Secretary or his duly authorized representative, and the Commission.

If (a) and (b) above are not accomplished on or before January 1, 1963, this Agreement shall ipso facto terminate on said date (hereinafter called "termination date") and thereafter be of no further force or effect, unless prior thereto this Agreement has been executed or ratified by Working Interest Owners owning a combined unit participation of at least ninety (90%) percent, and the Working Interest Owners owning a combined unit participation of at least ninety (90%) percent committed to this Agreement have decided to extend said termination date for a period not to exceed six (6) months (hereinafter called "extended termination date"). If said termination date is so extended and (a) and (b) are not accomplished on or before said extended termination date, this Agreement shall ipso facto terminate on said extended termination date and thereafter be of no further force or effect. For the purpose of this Section, ownership shall be computed on the basis of unit participation as determined from Exhibit "C" attached to the Unit Operating Agreement.

Unit Operator shall, within thirty (30) days after the effective date of this Agreement, file for record a certificate to the effect that this Agreement has become effective according to its terms and stating further the effective date and the location of the governmental agency offices where copies of this Agreement are filed.

The term of this Agreement shall be for and during the time that Unitized Substances are produced in paying quantities from the Unit Area and as long thereafter as drilling, reworking or other operations (including secondary recovery operations) are prosecuted thereon without cessation of more than ninety (90) consecutive days, unless sooner terminated by Working Interest Owners in the manner hereinafter provided.

This Agreement may be terminated with the approval of the Commissioner and the Director by Working Interest Owners owning ninety (90%) percent unit participation whenever such Working Interest Owners determine that Unit Operations are no longer profitable, feasible or in the interest of conservation. Notice of any such termination shall be given by Unit Operator to all parties hereto.

Upon termination of this Agreement, the further development and operation of the Unit Area as a Unit shall be abandoned, Unit operations shall cease, and thereafter the parties hereto shall be governed by the terms and provisions of the leases and contracts affecting the separate tracts.

If not otherwise covered by the leases unitized under this Agreement, Royalty Owners hereby grant Working Interest Owners a period of six (6) months after termination of this Agreement in which to salvage, sell, distribute or otherwise dispose of the personal property and facilities used in connection with Unit operations.

Section 24. RATE OF PROSPECTING, DEVELOPMENT AND PRODUCTION:

All production and the disposal thereof shall be in conformity with allocations and quotas made or fixed by any duly authorized person or regulatory body under any Federal or State statute. The Director and the Commissioner are hereby vested with authority to alter or modify from time to time, at their discretion, the rate of prospecting and development and within the limits made or fixed by the Commission to alter or modify the quantity and rate of production under this Agreement, such authority being hereby limited to alteration or modification in the

public interest, the purpose thereof and the public interest to be served thereby to be stated in the order of alteration or modification.

Powers in this Section vested in the Director and the Commissioner shall only be exercised after notice to Unit Operator and opportunity for hearing to be held not less than fifteen days from notice.

SECTION 25. NONDISCRIMINATION: In the performance of work under this agreement the Operator agrees to comply with the nondiscrimination provisions of Executive Order 10925 (26 F.R. 1977).

SECTION 26. APPEARANCES: Unit Operator shall have the right to appear for or on behalf of any and all interests affected hereby before the Commissioner, the Department, and the Commission, and to appeal from any order issued under the rules and regulations of the Commissioner, the Department, or the Commission, or to apply for relief from any of said rules and regulations or in any proceedings relative to operations before the Commissioner, the Department, or the Commission, or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his or its own expense to be heard in any such proceeding.

SECTION 27. NOTICES: All notices, demands, objections or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if made in writing and personally delivered to the party or parties or sent by postpaid certified mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party or parties may have furnished in writing to the party sending the notice, demand or statement.

SECTION 28. NO WAIVER OF CERTAIN RIGHTS: Nothing in this Agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as to the validity or invalidity of any law of the State wherein said unitized lands are located, or rules or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waive.

SECTION 29. UNAVOIDABLE DELAY: All obligations under this Agreement requiring the Unit Operator to commence or continue secondary recovery operations or to operate on or produce Unitized Substances from any of the lands covered by this Agreement shall be suspended while, but only so long as the Unit Operator despite the exercise of due care and diligence, is prevented from complying with such obligations, in whole or in part, by strikes, acts of God, Federal, State or municipal law or agency, unavoidable accident, uncontrollable delays in transportation, inability to obtain necessary materials in open market, or other matters beyond the reasonable control of the Unit Operator whether similar to matters herein enumerated or not.

SECTION 30. LOSS OF TITLE: In the event title to any tract of unitized land shall fail so as to render the tract inoperable under this Agreement and the true owner cannot be induced to join this Unit Agreement, such tract shall be automatically regarded as not committed hereto and there shall be such readjustment of future costs and benefits as may be required on account of the loss of such title. In the event of a dispute as to title as to any Royalty, Working Interest or other interest

subject thereto, payment or delivery on account thereof may be withheld without liability or interest until the dispute is finally settled; provided, that as to State or Federal land or leases, no payments of funds due the State of New Mexico or the United States of America shall be withheld, but such funds shall be deposited as directed by the Commissioner or the Supervisor (as the case may be), to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

Unit Operator as such is relieved from any responsibility for any defect or failure of any title hereunder.

SECTION 31. NONJOINDER AND SUBSEQUENT JOINDER: If the owner of any substantial interest in a tract within the Unit Area fails or refuses to subscribe, ratify, or consent in writing to this Agreement, the Working Interest Owner in that tract who has executed or ratified this Agreement may withdraw said tract from this Agreement by written notice to the Director, the Commissioner, and Unit Operator prior to the effective date of this Agreement. Joinder by any Royalty Owner, at any time, must be accompanied by appropriate joinder of the corresponding Working Interest Owner in order for the interest of such Royalty Owner to be regarded as effectively committed. Joinder to the Unit Agreement by a Working Interest Owner, at any time, must be accompanied by appropriate joinder to the Unit Operating Agreement in order for such interest to be regarded as effectively committed to this Unit Agreement.

Any oil or gas interest in the lands in the Unit Area not committed hereto prior to submission of this Agreement to the Commissioner and the Director for final approval may thereafter be committed hereto upon compliance with the applicable provisions of this Section and of Section 14 (Tracts Qualified for Unit Participation) hereof, at any time up to the effective date hereof and for a period to and including six (6) months thereafter, on the same basis of participation as provided in said Section 14, by the owner or owners thereof subscribing, ratifying, or consenting in writing to this Agreement and, if the interest is a Working Interest, by the owner of such interest subscribing also to the Unit Operating Agreement.

It is understood and agreed, however, that from and after six (6) months from the effective date hereof the right of subsequent joinder as provided in this Section shall be subject to such requirements or approvals and on such basis as may be agreed upon by ninety (90%) percent of the Working Interest Owners (based upon percentage participation in the Unit Area). Such joinder by a proposed Working Interest Owner must be evidenced by his execution or ratification of this Agreement and the Unit Operating Agreement. Such joinder by a proposed Royalty Owner must be evidenced by his execution, ratification or consent of this Agreement and must be consented to in writing by the Working Interest Owner responsible for the payment of any benefits that may accrue hereunder in behalf of such proposed Royalty Owner. Except as may be otherwise herein provided, subsequent joinder to this Agreement shall be effective at 7:00 a.m. as of the first day of the month following the filing with the Commissioner and the Supervisor of duly executed counterparts of any and all documents necessary to establish effective commitment of any tract or interest to this Agreement, unless objection to such joinder by the Commissioner or the Director is duly made within sixty (60) days after such filing.

SECTION 32. COUNTERPARTS: This Agreement may be executed in any number of counterparts, no one of which needs to be executed by all parties and may be ratified or consented to by separate instrument in writing specifically referring hereto, and shall be binding upon all those parties who have executed such a counterpart, ratification or consent hereto with the same force and effect as if all parties had signed the same document, and regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands within the above described Unit Area.

SECTION 33. TAXES: Each party hereto shall, for its own account, render and pay its share of any taxes levied against or measured by the amount or value of the Unitized Substances produced from the unitized land; provided, however, that if it is required or if it be determined that the Unit Operator or the several Working Interest Owners must pay or advance said taxes for the account of the parties hereto, it is hereby

expressly agreed that the parties so paying or advancing said taxes shall be reimbursed therefor by the parties hereto, including Royalty Owners, who may be responsible for the taxes on their respective allocated share of said Unitized Substances. No such taxes shall be charged to the United States or to the State of New Mexico, nor to any lessor who has a contract with a lessee which requires his lessee to pay such taxes.

SECTION 34. CONFLICT OF SUPERVISION: Neither the Unit Operator nor the Working Interest Owners, nor any of them, shall be subject to any forfeiture, termination or expiration of any rights hereunder or under any leases or contracts subject hereto, or to any penalty or liability on account of delay or failure in whole or in part to comply with any applicable provisions thereof to the extent that the said Unit Operator or the Working Interest Owners, or any of them, are hindered, delayed or prevented from complying therewith by reason of failure of the Unit Operator to obtain, in the exercise of due diligence, the concurrence of proper representatives of the United States and proper representatives of the State of New Mexico in and about any matters or things concerning which it is required herein that such concurrence be obtained. The parties hereto and the Commission agree that all powers and authority vested in the Commission in and by any provisions of this Agreement are vested in the Commission and shall be exercised by it pursuant to the provisions of the laws of the State of New Mexico and subject in any case to appeal or judicial review as may now or hereafter be provided by the laws of the State of New Mexico.

SECTION 35. LIMITATION OF APPROVALS: Notwithstanding anything herein contained to the contrary, if no Federal lands are committed to this Agreement, then no consents or approvals provided herein shall be required of the Department, the Secretary, the Director, or the Supervisor, and it shall not be necessary to file any instrument hereunder with said officers or agencies unless and until Federal lands are so committed to this Agreement; likewise, if no State lands are committed to this Agreement, then no consents or approvals provided herein shall be

required of the Commissioner, and it shall not be necessary to file any instrument hereunder with said officer unless and until State lands are so committed to this Agreement.

SECTION 36. OIL PAYMENT RESERVATION: Notwithstanding any other provisions of this Agreement to the contrary, each Working Interest Owner reserves unto itself and expressly excepts from the provisions and effects of this Agreement, those certain reservations described in the Oil Reversion Agreement executed by Working Interest Owners simultaneously with their execution of this Unit Agreement, all in accordance with the terms and provisions of such Oil Reservation Agreement which sets out in detail the agreement of Working Interest Owners with respect to the reservations herein made.

It is further understood and agreed, however, that the rights and interests of Royalty Owners, as herein set out, shall in no manner be affected or altered by such reservations and exceptions by Working Interest Owners or by the provisions and terms of said Oil Reservation Agreement, and such reservations and exceptions shall not alter or affect the tract participation assigned to each tract listed and described in Exhibit "B".

SECTION 37. NO PARTNERSHIP: It is expressly agreed that the relation of the parties hereto is that of independent contractors and nothing in this Agreement contained, expressed or implied, or any operations conducted hereunder, shall create or be deemed to create a partnership or association between the parties hereto or any of them.

SECTION 38. OIL IN LEASE TANKAGE ON EFFECTIVE DATE: Unit Operator shall make a proper and timely gauge of all lease and other tanks within the Unit Area in order to ascertain the amount of merchantable oil in such tanks, above the pipe line connections, as of 7:00 A.M. on the effective date hereof. All such oil as is a part of the prior allowable of the well or wells from which the same was produced shall be and remain the property of the Working Interest Owners entitled thereto the same as if the Unit had not been formed, and such Working Interest Owners shall promptly remove said oil from the Unit Area. Any such oil not so removed may be sold by the Unit Operator for the account of such Working Interest Owners, subject to the payment of all Royalty to Royalty Owners under the terms and provisions of the applicable lease or leases and other contracts. All such oil and gas as is in excess of the prior allowable of the well or wells from which the same was produced shall be regarded and treated the same as Unitized Substances produced after the effective date hereof.

If, as of the effective date hereof, any tract is overproduced with respect to the allowable of the well or wells on that tract and the amount of such overproduction has been sold or otherwise disposed of, such overproduction shall be regarded and included as a part of the Unitized Substances produced after the effective date hereof and the amount thereof charged to such tract as having been delivered to the persons entitled to Unitized Substances allocated to such tract.

SECTION 39. PERSONAL PROPERTY EXCEPTED: All lease and well equipment, materials, and other facilities heretofore or hereafter placed by any of the Working Interest Owners on the lands subject to this Agreement shall be deemed to be and shall remain personal property belonging to and may be removed by the Working Interest Owners (subject to the provisions of Section 12). The rights and interests therein as among Working Interest Owners are covered by the Unit Operating Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and have set opposite their respective names the date of execution.

Date: November 24, 1961
AS TO STATEMENTS AND BILLINGS:
Terms Net 30 Days
Form JSP

TEXACO Inc.
By J. M. Markley
Attorney-in-Fact
Address: P. O. Box 3109
Midland, Texas

UNIT OPERATOR AND WORKING INTEREST OWNER.

Trade Approved By C. D. E. J. Form Approved By Kem

~~ATTEST~~
Secretary
Date: November 21, 1961

Humble Oil & Refining Company
By Oliver A. O. R.
AGENT AND ATTORNEY IN FACT
Address: _____
AS TO STATEMENTS AND BILLINGS:
P. O. Box 2180
Houston 1, Texas, Attn.: Production & Exploration Accounting Office

APPROVED	
Date	<u>M. B. M.</u>
Attn.	<u>M. B. M.</u>
Form	<u>C. D. E. J.</u>
Trade	<u>M. B. M.</u>

WORKING INTEREST OWNERS

AS TO NOTICES:
P. O. Box 1600
Midland, Texas, Attn.: Manager, Production Department

WEST LOVINGTON UNIT AGREEMENT

WORKING INTEREST OWNERS

ATTEST:

[Signature]
Asst. Secretary

Date: NOV 13 1961

Tidewater Oil Company
By [Signature]
Vice President

Address: TIDEWATER OIL COMPANY
P. O. BOX 1404
HOUSTON 1, TEXAS

ATTEST:

Secretary

Date: _____

By [Signature]

Address: FRED TURNER, JR.
BOX 910
MIDLAND, TEXAS

ATTEST:

Secretary

Date: Nov. 17, 1961

SOCONY MOBIL OIL COMPANY, INC.

By [Signature]
Attorney-in-Fact

Address: P. O. BOX 633
MIDLAND, TEXAS

APPROVED	
Acctg.	<u>[Signature]</u>
Gas	<u>[Signature]</u>
Land	<u>[Signature]</u>
Legal	<u>[Signature]</u>
P. E.	<u>[Signature]</u>
Title R.	<u>[Signature]</u>
Prod.	<u>[Signature]</u>

ATTEST:

[Signature]
Secretary

Date: Nov. 17, 1961

By [Signature]

Address: _____

ATTEST:

Secretary

Date: Nov. 17, 1961

By [Signature]

Address: Box 3826
Odessa, Texas

ATTEST:

Thomas E. Rodman
Secretary

Date: Nov. 17, 1961

Redman-Noel Oil Corporation

By [Signature]

Address: Box 3826
Odessa, Texas

ILLEGIBLE

WEST LOVINGTON UNIT AGREEMENT

WORKING INTEREST OWNERS

ATTEST:

ASSR. Secretary

Date: NOV 16 1961

By H. Eitzjans
VICE PRESIDENT

Address: _____

ATTEST:

Secretary

Date: _____

By _____

Address: _____

ATTEST:

Secretary

Date: _____

By _____

Address: _____

ATTEST:

Secretary

Date: _____

By _____

Address: _____

ATTEST:

Secretary

Date: _____

By _____

Address: _____

ATTEST:

Secretary

Date: _____

By _____

Address: _____

STATE OF ~~NEW MEXICO~~ TEXAS
COUNTY OF Ector

The foregoing instrument was acknowledged before me this
17 day of November, 19 61 by
M. T. Johnson

My Commission Expires:
June 1, 1963

Jan Kennedy
Notary Public in and for
Ector County, ~~NEW MEXICO~~ TEXAS

STATE OF ~~NEW MEXICO~~ TEXAS
COUNTY OF Ector

The foregoing instrument was acknowledged before me this
17 day of November, 19 61 by
E. G. Rodman

My Commission Expires:
June 1, 1963

Jan Kennedy
Notary Public in and for
Ector County, ~~NEW MEXICO~~ TEXAS

STATE OF ~~NEW MEXICO~~ TEXAS
COUNTY OF Ector

The foregoing instrument was acknowledged before me this
17 day of November, 19 61 by
W. D. Noel, President of
Rodman-Noel Oil Corporation, a Texas
Corporation, on behalf of said Corporation.

My Commission Expires:
June 1, 1963

Jan Kennedy
Notary Public in and for
Ector County, ~~NEW MEXICO~~ TEXAS

STATE OF NEW MEXICO
COUNTY OF _____

The foregoing instrument was acknowledged before me this
____ day of _____, 19____, by _____ of
_____, a
Corporation, on behalf of said Corporation.

My Commission Expires:

Notary Public in and for
____ County, New Mexico.

STATE OF ~~TEXAS~~ TEXAS

COUNTY OF ~~TARRANT~~ TARRANT

The foregoing instrument was acknowledged before me this
13th day of November, 1961, by
E. B. MILLER, JR.

My Commission Expires:

June 1, 1963

Molly Pittkin
Notary Public in and for

TARRANT County, ~~TEXAS~~ TEXAS

Notary Public in and for Tarrant County, Texas
My Commission Expires June 1, 1963

STATE OF ~~NEW MEXICO~~ TEXAS

COUNTY OF MIDLAND

The foregoing instrument was acknowledged before me this
16 day of November, 1961, by

FRED TURNER, JR.

My Commission Expires:

June 1, 1963

Marjorie Kelly
Notary Public in and for

MIDLAND County, ~~NEW MEXICO~~ TEXAS

Notary Public

STATE OF ~~NEW MEXICO~~ TEXAS

COUNTY OF MIDLAND

The foregoing instrument was acknowledged before me this
17th day of November, 1961, by

W. G. Moriarty, Attorney-in-Fact of

Socony Mobil Oil Company, Inc., a New York

Corporation, on behalf of said Corporation.

My Commission Expires:

June 1, 1963

N. H. Morgan
Notary Public in and for

Midland County, ~~NEW MEXICO~~ Texas.

E. H. MORGAN, Notary Public
Midland County, Texas

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this
____ day of _____, 19____, by _____

of

_____, a _____
Corporation, on behalf of said Corporation.

My Commission Expires:

Notary Public in and for

____ County, New Mexico.

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 19____, by _____.

My Commission Expires: _____

Notary Public in and for _____ County, New Mexico.

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 19____, by _____.

My Commission Expires: _____

Notary Public in and for _____ County, New Mexico.

STATE OF ~~NEW MEXICO~~ TEXAS

COUNTY OF HARRIS

The foregoing instrument was acknowledged before me this 21st day of November, 1961, by JOHN F. McRAE of AGENT AND ATTORNEY IN FACT of Amble Oil & Refining Company, a Delaware Corporation, on behalf of said Corporation.

My Commission Expires: WAVIE KALLANDER
My Commission Expires June 1, 1963

Wavie Kallander
Notary Public in and for HARRIS County, New MAY 1991 TEXAS

STATE OF ~~NEW MEXICO~~ TEXAS

COUNTY OF MIDLAND

The foregoing instrument was acknowledged before me this 24th day of November, 1961, by J. H. MURLEY of Attorney-in-Fact of TEXACO Inc., a Delaware Corporation, on behalf of said Corporation.

My Commission Expires: _____
June 1, 1963

LODOTHY LANGAS
Lodothy Langas
Notary Public in and for Midland County, ~~NEW MEXICO~~ Texas.

ILLEGIBLE

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this
_____ day of _____, 19____, by _____

My Commission Expires: _____

Notary Public in and for
_____ County, New Mexico.

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this
_____ day of _____, 19____, by _____

My Commission Expires: _____

Notary Public in and for
_____ County, New Mexico.

STATE OF NEW MEXICO

COUNTY OF _____

The foregoing instrument was acknowledged before me this
_____ day of _____, 19____, by _____ of
_____, a
Corporation, on behalf of said Corporation.

My Commission Expires: _____

Notary Public in and for
_____ County, New Mexico.

Oklahoma
STATE OF ~~NEW MEXICO~~

COUNTY OF *Washington*

16th The foregoing instrument was acknowledged before me this
day of *November*, 19*64*, by
L. E. FITZGERALD, VICE PRESIDENT of
Phillips Petroleum Company, a *Delaware*
Corporation, on behalf of said Corporation.

My Commission Expires: *Oct. 12, 1962*

Russell J. McLaughlin
Notary Public in and for
_____ County, New Mexico.

Attest g. Oker

RATIFICATION AND JOINDER
WEST LOVINGTON UNIT
LEA COUNTY, NEW MEXICO

KNOW ALL MEN BY THESE PRESENTS:

THAT, WHEREAS, the undersigned party hereto (whether one or more) is the owner of lands or leases, or working interests, or royalty interests therein, in the Unit Area covered by the Unit Agreement for the Development and Operation of the West Lovington Unit Area, County of Lea, State of New Mexico,

NOW, THEREFORE, in consideration of the execution of the Unit Agreement for the Development and Operation of the West Lovington Unit Area, County of Lea, State of New Mexico, dated the 1st. day of May, 1961, in form approved on behalf of the Secretary of the Interior and the Commissioner of Public Lands of the State of New Mexico, the undersigned, whether one or more, hereby expressly joins said Unit Agreement and ratifies, approves, and adopts said agreement, and all of its terms and provisions.

This Ratification and Joinder shall be effective as to the undersigned's interest in any lands and leases, or interests therein, and royalties presently held or which may arise under existing option agreements or other interests in unitized substances, covering any of the following described land:

T-17-S, R-36 -E, Lea County, New Mexico

Section 4:	S/2 NE/4, SE/4	(Unit Tract No. 12)
Section 5:	SW/4 NW/4	(Unit Tract No. 7)
Section 6:	SE/4 SW/4	(Unit Tract No. 13)

It is the intent of the parties to describe above all the lands in the Unit Area in which the undersigned has any interest, but if the undersigned shall be found to have any interests as above described in any additional lands within the Unit Area, the undersigned expressly joins said Unit Agreement and fully ratifies, approves and adopts it as to said additional lands and interests even though they may not be specifically described above.

In the event any undersigned party hereto is the owner of a "Working Interest", as that term is defined in said Unit Agreement, in any lands within the Unit Area, such party does also hereby ratify, approve and adopt that certain Unit Operating Agreement, West Lovington Unit, County of Lea, State of New Mexico, dated the 1st. day of May, 1961, and does hereby stipulate that such working interest shall be subject to all of the terms and provisions of said Unit Operating Agreement.

This Ratification and Joinder may be executed in any number of counterparts with the same force and effect as if all parties had signed the same document and shall be binding upon all those who execute a counterpart hereof, regardless of whether or not it is executed by all other parties owning or claiming an interest in the lands affected hereby, and when so executed shall be binding upon the undersigned, his heirs, devisees, assigns, or successors in interest.

Date _____

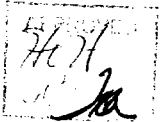
ATTEST:

Karl R. Gaudsmith
Secretary

PAN AMERICAN PETROLEUM CORPORATION

By C. F. Bedford

Its ATTORNEY-IN-FACT



STATE OF Texas

COUNTY OF Harris

On this 9th day of November, 1961, before me appeared C. F. BEDFORD, to me personally known, who, being by me duly sworn did say that he is the ATTORNEY-IN-FACT of PAN AMERICAN PETROLEUM CORPORATION, and that the seal affixed to said instrument is the corporate seal of said corporation and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said C. F. BEDFORD acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal on this, the day and year first above written.

Lonnie S. Fickel
NOTARY PUBLIC in and for

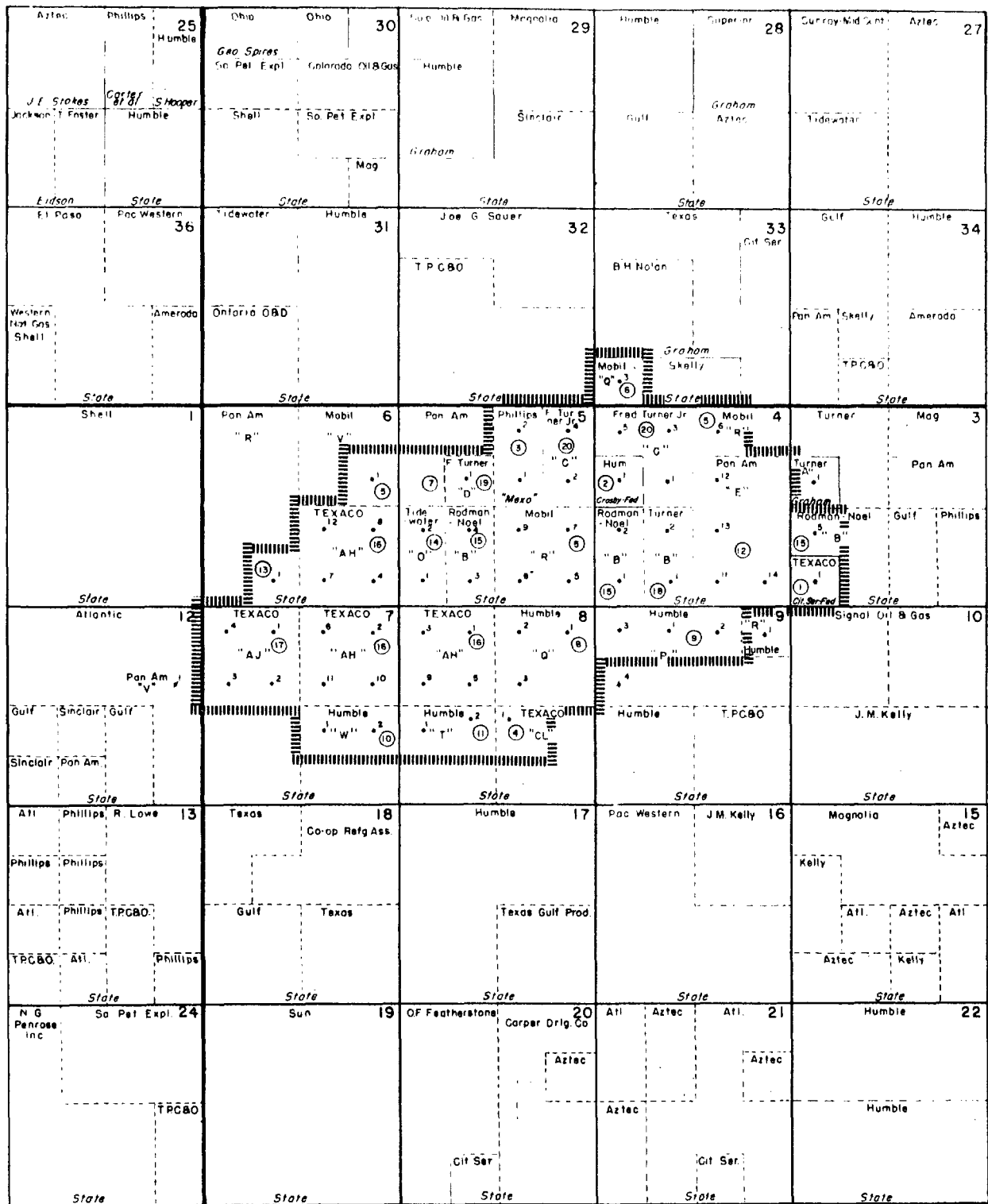
Harris County, Texas

My Commission Expires:

6-1-63

R-35-E

R-36-E



FEDERAL LEASES

NM-020491
LC- 062383

STATE LEASES

B-8197 B-9042 B-10639-1
B-3009 B-1553 B-10639-2
E-620 B-10639 B-4119-8
B-2894 B-4119-4
B-4704 B-4120-1
B-7016 B-4287-1
B-8291 B-4286

EXHIBIT "A"

WEST LOVINGTON UNIT AREA
LEA COUNTY NEW MEXICO

• PRODUCING OIL WELL
* ABANDONED PRODUCING WELL
+ DRY HOLE

SCALE
0 2000 4000

LEGEND

Unit Boundary
Tract Number

EXHIBIT "B"

SCHEDULE SHOWING THE PERCENTAGE AND KIND OF OWNERSHIP

Tract Number	Description	No. of Acres	Serial No. & Date of Lease or Application	Basic Royalty & Percentage	Lessee of Record	Overriding Royalty and Percentage	Working Interest & Percentage	Percent Participation of Tract In Unit
<u>FEDERAL LAND</u>								
1	T-17-S, R-36-E Sec. 3: SW/4 SW/4	40.00	NM-020491 10-1-55	USA 12½%-25%	TEXACO Inc.	None	TEXACO Inc. 100%	1.231759
2	T-17-S, R-36-E Sec. 4: SW/4 NW/4	40.00	LC-062383 1-1-44	USA 12½%-25%	Humble Oil & Refining Co.	None	Humble Oil & Refining Co. 100%	1.391611
<u>STATE LAND</u>								
3	T-17-S, R-36-E Sec. 5: Lot 2, SW/4 NE/4	79.47	B-8197 6-10-39	State 12½%	Phillips Petroleum Co.	None	Phillips Petroleum Co. 100%	1.934709
4	T-17-S, R-36-E Sec. 8: NW/4 SE/4	40.00	E-620-1 11-10-45	State 12½%	TEXACO Inc.	None	TEXACO Inc. 100%	2.210701
5	T-17-S, R-36-E Sec. 4: NW/4 NE/4 Sec. 5: SE/4 Sec. 6: SE/4 NE/4	239.42	B-3009 6-11-34	State 12½%	Magnolia Petroleum Co.	None	Socony Mobil Oil Co., Inc. 100%	11.164471
6	T-16-S, R-36-E Sec. 33: SW/4 SW/4	40.00	B-2894 5-10-34	State 12½%	Magnolia Petroleum Co.	None	Socony Mobil Oil Co., Inc. 100%	0.662646
7	T-17-S, R-36-E Sec. 5: SW/4 NW/4	40.00	B-10639-2 9-10-43	State 12½%	Pan American Petroleum Corp.	None	Pan American Petroleum Corp. 100%	0.884786
8	T-17-S, R-36-E Sec. 8: NE/4	160.00	B-4704 8-10-35	State 12½%	Humble Oil & Refining Co.	None	Humble Oil & Refining Co. 100%	7.740718

EXHIBIT "B"

SCHEDULE SHOWING THE PERCENTAGE AND KIND OF OWNERSHIP

Tract Number	Description	No. of Acres	Serial No. & Date of Lease or Application	Basic Royalty & Percentage	Lessee of Record	Overriding Royalty and Percentage	Working Interest & Percentage	Percent Participation of Tract in Unit
9	T-17-S, R-36-E Sec. 9: N/2 NW/4, NW/4 NE/4	120.00	B-7016 5-11-37	State 12½%	Humble Oil & Refining Co.	None	Humble Oil & Refining Co. 100%	5.696457
10	T-17-S, R-36-E Sec. 7: N/2 SE/4	80.00	B-8291 8-10-39	State 12½%	Humble Oil & Refining Co.	None	Humble Oil & Refining Co. 100%	2.256003
11	T-17-S, R-36-E Sec. 8: N/2 SW/4	80.00	B-9042 3-10-41	State 12½%	Humble Oil & Refining Co.	None	Humble Oil & Refining Co. 100%	2.498771
12	T-17-S, R-36-E Sec. 4: S/2 NE/4, SE/4	240.00	B-1553 12-27-32	State 12½%	Pan American Petroleum Corp.	None	Pan American Petroleum Corp. 100%	9.933178
13	T-17-S, R-36-E Sec. 6: SE/4 SW/4	40.00	B-10639 9-10-43	State 12½%	Pan American Petroleum Corp.	None	Pan American Petroleum Corp. 100%	1.739149
14	T-17-S, R-36-E Sec. 5: W/2 SW/4	80.00	B-4119-4 4-10-35	State 12½%	Tidewater Oil Company	None	Tidewater Oil Company 100%	3.918039
15	T-17-S, R-36-E Sec. 3: NW/4 SW/4 Sec. 4: W/2 SW/4 Sec. 5: E/2 SW/4	200.00	B-4119-8 4-10-35	State 12½%	E. G. Rodman, Rodman-Noel Oil Corp., M.T.Johnson	None	E. G. Rodman Rodman-Noel Oil Corp. M.T.Johnson 100%	8.622167
16	T-17-S, R-36-E Sec. 6: SE/4 Sec. 7: NE/4 Sec. 8: NW/4	480.00	B-4120-1 4-10-35	State 12½%	TEXACO Inc.	None	TEXACO Inc. 100%	19.248866

EXHIBIT "B"

SCHEDULE SHOWING THE PERCENTAGE AND KIND OF OWNERSHIP

Tract Number	Description	No. of Acres	Serial No. & Date of Lease or Application	Basic Royalty & Percentage	Lessee of Record	Overriding Royalty and Percentage	Working Interest & Percentage	Percent Participation of Tract in Unit
17	T-17-S, R-36-E Sec 7: Lots 1, 2, E/2 NW/4	154.79	B-4287-1 5-10-35	State 12½%	TEXACO Inc.	None	TEXACO Inc. 100%	5.715138
13	T-17-S, R-36-E Sec. 4: E/2 SW/4	80.00	B-4119 4-10-35	State 12½%	Fred Turner, Jr.	None	Fred Turner, Jr. 100%	5.227079
19	T-17-S, R-36-E Sec 5: SE/4 NW/4	40.00	B-10639-1 9-10-43	State 12½%	Fred Turner, Jr	Pan American Petroleum Corporation 5.46875%	Fred Turner, Jr. 100%	1.137029
20	T-17-S, R-36-E Sec. 4: Lots 3, 4, SE/4 NW/4 Sec. 5: Lot 1, SE/4 NE/4	198.53	B-4286 5-10-35	State 12½%	Fred Turner, Jr.	The Ohio Oil Co. 6.25%	Fred Turner, Jr. 100%	6.736723

EXHIBIT "B"

SCHEDULE SHOWING THE PERCENTAGE AND KIND OF OWNERSHIP

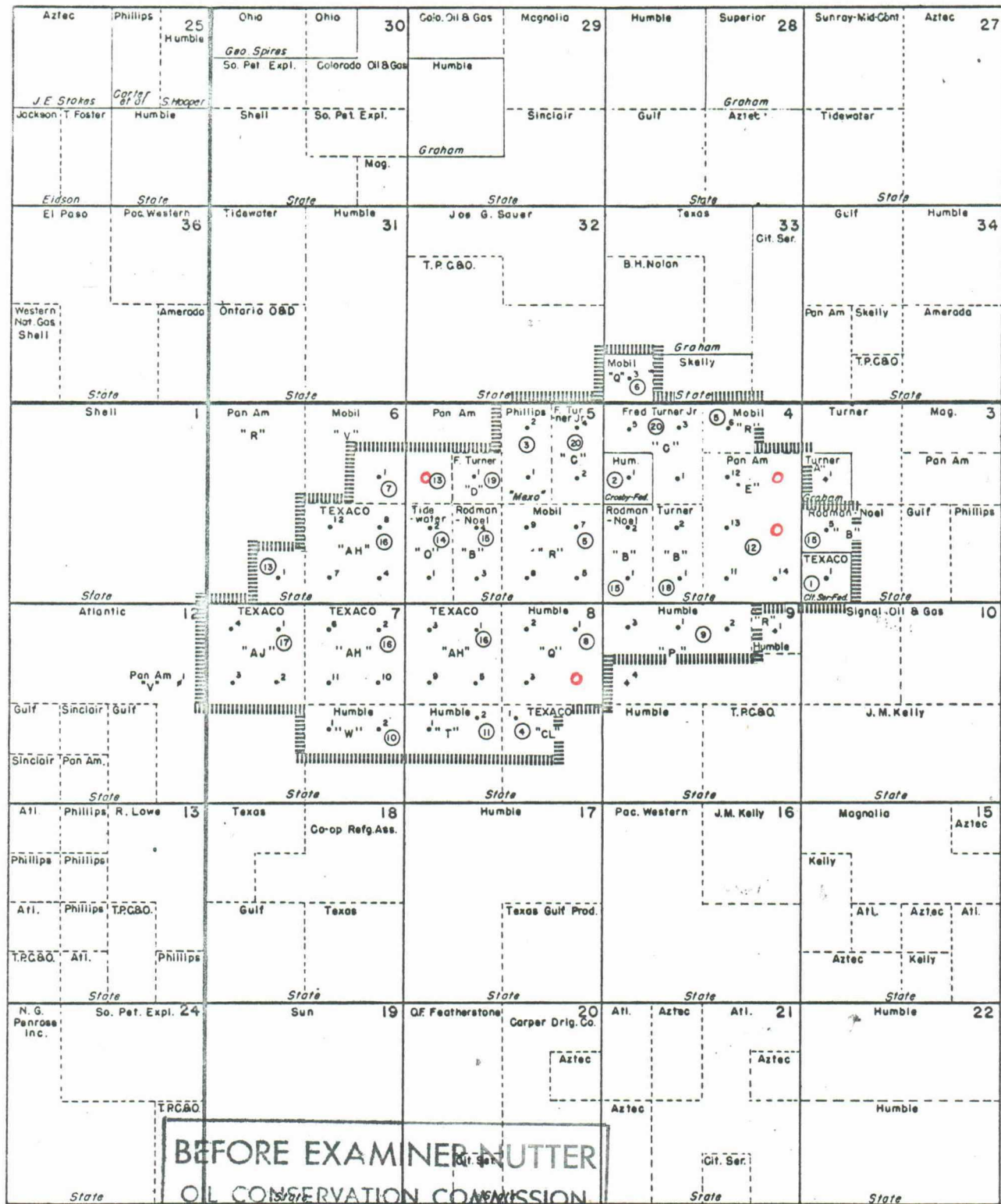
<u>RECAPITULATION OF ACRES</u>		
Federal Land	80.00 acres	3.236% of the unit area
State Land	<u>2,392.21 acres</u>	<u>96.764%</u> of the unit area
Total	2,472.21 acres	100.000%

RECAPITULATION OF UNIT PARTICIPATION

Humble Oil & Refining Company	19.583560%
Pan American Petroleum Corporation	12.557113%
Phillips Petroleum Company	1.934709%
E. G. Rodman, Rodman-Noel Oil Corporation, M. T. Johnson	8.622167%
Socony Mobil Oil Company, Inc.	11.827117%
TEXACO Inc.	28.406464%
Tidewater Oil Company	3.918039%
Fred Turner, Jr.	<u>13.150831%</u>
Total	100.000000%

R-35-E

R-36-E



FEDERAL LEASES

NM-020491
LC- 062383

STATE LEASES

B-8197 B-9042
B-3009 B-1553
E-620 B-10639
B-2894 B-4119
B-4704 B-4120-1
B-7016 B-4287-1
B-8291 B-4286

WEST LOVINGTON UNIT AREA
LEA COUNTY NEW MEXICO

○ Proposed Producing Well
● PRODUCING OIL WELL
+ ABANDONED PRODUCING WELL
★ DRY HOLE

SCALE
2000 4000



LEGEND

Unit Boundary
Tract Number

PROPOSED WEST LOVINGTON UNIT
PARTICIPATION FACTORS
Lea County, New Mexico

Tract	Adjusted Cum. Prod. (9-1-59) Barrels	Adjusted Cum. Prod. Percent	Gross Acre-Ft. Percent	Surface Acre-Ft. Percent	Current Rate Prod., 1st 8 Mo., 1959, Bbls.	Current Rate Percent	Participation Factor*
Humbly							
Loc. SE/4 NE/4,	91,953	1.319535	15,800	1.601836	40	1.617985	1.391511
State "p"	444,663	6.380922	47,340	4.850117	120	4.853355	5.65457
State "q"	451,951	6.485545	50,160	5.053323	120	4.853355	6.230472
Sec. 8	120,000	1.722013	16,040	1.626168	40	1.617985	1.510246
State "r"	123,604	1.773731	29,760	3.017130	80	3.235971	2.469771
State "w"	91,332	1.310624	30,520	3.094180	80	3.235971	2.256003
Company Total	1,323,503	18.992410	190,120	19.274754	480	19.415226	19.563550
Hobbs							
State "q"	9,641	0.133349	13,280	1.346353	40	1.617985	0.652646
State "r"	809,628	11.612249	82,033	8.315573	199.42	8.056166	10.473946
State "w"	14,813	0.212568	13,800	1.399072	40	1.617985	0.745322
Company Total	834,082	11.969166	109,113	11.062098	279.42	11.302433	11.827117
Pen American							
State "w"	570,402	8.185330	66,680	6.760154	160	6.471940	8.956
Loc. NE/4 SE/4,	80,000	1.148009	17,280	1.751882	40	1.617985	1.254572
Loc. SE/4 NE/4	63,000	0.904057	16,200	1.642339	40	1.617985	1.105323
State "w"	127,905	1.835450	15,160	1.536952	40	1.617985	1.739149
Loc. SE/4 NE/4,	40,600	0.582614	13,840	1.403127	40	1.617985	0.884755
Sec. 5	881,907	12.555450	129,160	13.094504	320	12.943604	12.557113
Company Total	89,959	1.290921	29,138	2.954070	79.47	3.214533	1.934709
Phillips							
Loc. SE/4	630,654	9.049953	83,320	8.447152	200	8.089928	8.434
State "w"	150,315	2.157051	15,320	1.553173	40	1.617985	2.210701
State "w"	1,369,178	19.647851	193,560	19.826272	480	19.415226	17,001
State "w"	367,323	5.271124	62,573	6.343778	154.79	6.261199	6,058
Cities Service	55,000	0.789256	16,520	1.674831	40	1.617985	1.920
Company Total	1,941,817	27.865282	289,973	29.398054	714.79	28.912997	30,455
Widewater							
State "w"	288,476	4.139662	32,800	3.325331	80	3.235971	5,807
Pied Turner							
State "w"	419,263	6.015459	34,160	3.463210	80	3.235971	9,480
State "w"	496,110	7.119232	74,104	7.512815	198.53	8.030455	1,577
State "w"	62,813	0.901445	14,480	1.458012	40	1.617985	1,837
State "w"	978,191	14.037446	122,744	12.444037	318.53	12.854423	11,894
Company Total	6,958,529	100.000000	925,358	100.000000	2,472.21	100.000000	109,261

* Based on a formula of 50 per cent adjusted cumulative production (9-1-59) plus 25 per cent gross acre-foot plus 15 per cent surface acres plus 10 per cent current rate (first eight months, 1959).

RECAPITULATION

Federal Acreage	145,953	2.108791	32,320	3.275657	80	3.235972	2,889	2.641127	2.623370
State Acreage	6,821,636	97.891209	954,048	96.723333	2,392.21	96.754028	106,372	97.345713	97.376530
	6,958,589	100.000000	986,368	100.000000	2,472.21	100.000000	109,261	100.000000	100.000000

BEFORE EXAMINER NUTTER

OIL CONSERVATION COMMISSION

EXHIBIT NO. 4

CASE NO. 2380

AREA TO BE DESIGNATED TO UNIT
WEST LOVINGTON POOL
LEA COUNTY, NEW MEXICO

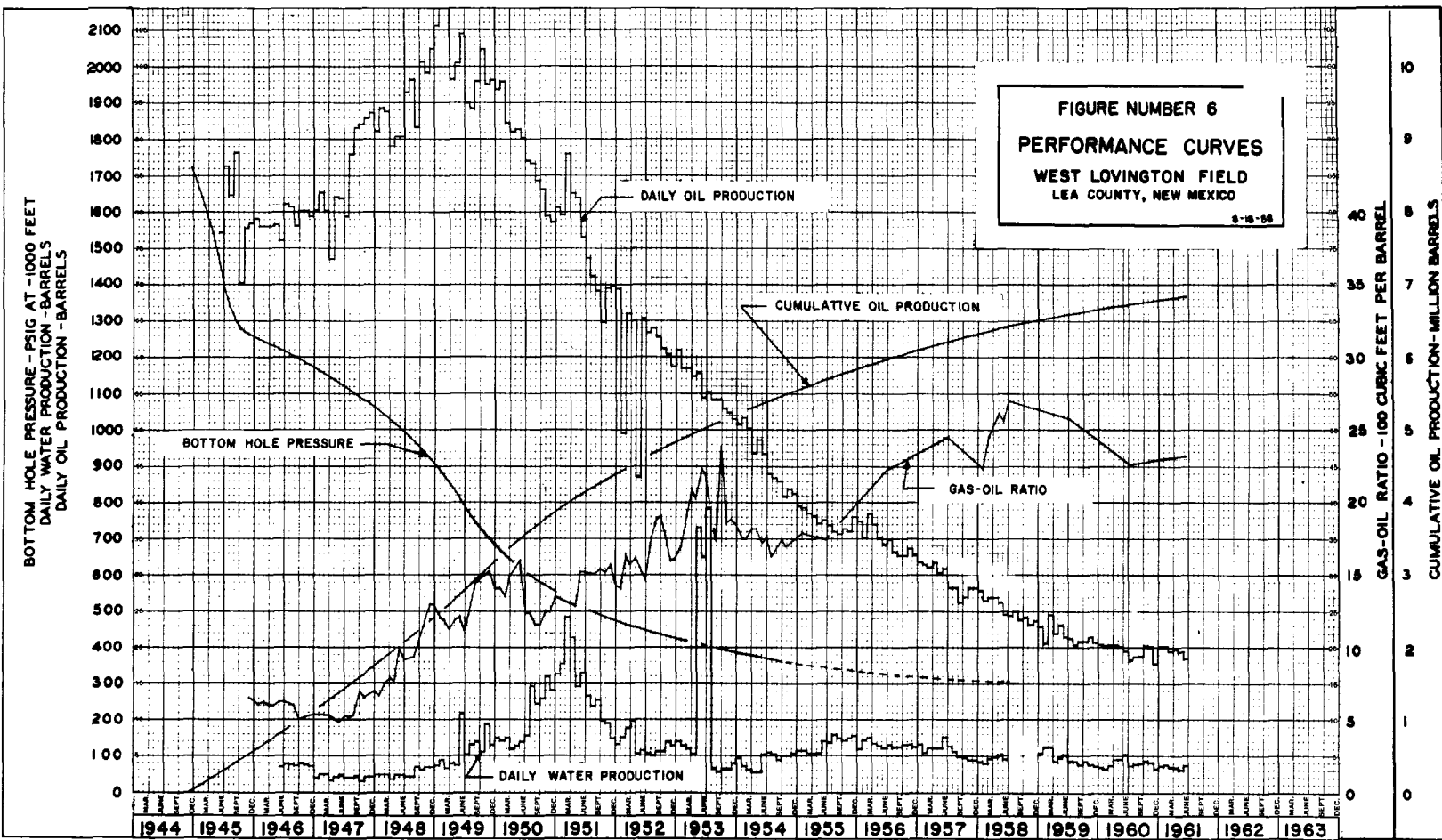
Township 16 South, Range 36 East
New Mexico Principal Meridian

Section 33: SW/4 SW/4

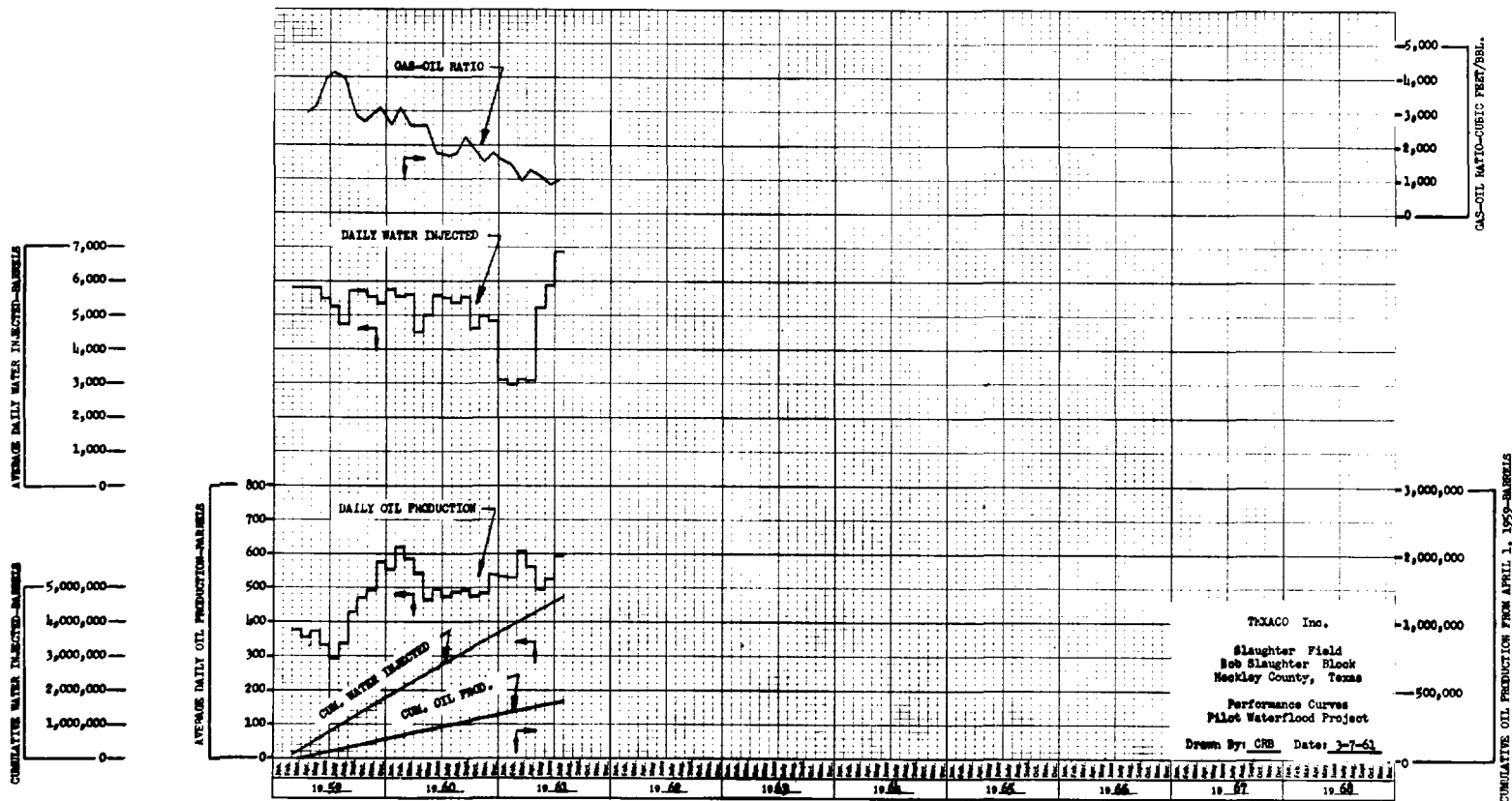
Township 17 South, Range 36 East
New Mexico Principal Meridian

Section 3: W/2 SW/4
Section 4: Lots 2, 3, 4, S/2 N/2, S/2
Section 5: Lots 1, 2, S/2 N/2, S/2
Section 6: SE/4 NE/4, SE/4 SW/4, SE/4
Section 7: Lots 1, 2, E/2 NW/4, NE/4, N/2 SE/4
Section 8: N/2, N/2 SW/4, NW/4 SE/4
Section 9: N/2 NW/4, NW/4 NE/4

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 2385



2385



BEFORE EXAMINER NUTTER
 OIL CONSERVATION COMMISSION
 EXHIBIT NO. 24
 CASE NO. 2385

FIELD CHARACTERISTICS

	<u>West Lovington</u>	<u>Slaughter</u>
Formation	San Andres	San Andres
Depth	4750'	4965'
Average Net Pay Thickness	46'	40'
Average Porosity	8.4 per cent	13.0 per cent
Average Permeability	86.5 md.	8.5 md.
Water Saturation	25 per cent	30 per cent
API Gravity of Crude	34°	32°
Initial Pressure	1800 psi	1720 psi
Type of Drive	Solution Gas	Solution Gas

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 23
CASE NO. 9385