BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

PROCEEDINGS

The following matter came on for consideration before a hearing of the Oil Conservation Commission of the State of New Mexico, pursuant to legal notice, at Santa Fe, New Mexico, May 23, 1950, at 10:00 A. M.

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice pursuant to law and the rules and regulations of said Commission promulgated thereunder, of the following public hearing to be held May 23, 1950, beginning at 10:00 o'clock a.m. on that day in the City of Santa Fe, New Mexico, in the Capitol (Hall of Representatives)

STATE OF NEW MEXICO TO:

All named parties in the following cases and notice to the public:

Case 220

In the matter of the application of the Skelly Oil Company for an exception to Rule 104 for the formation of an unorthodox unit in Section 2, Township 23S, Range 36E, N.M.P.M., Langlie-Mattix pool, Lea County, New Mexico.

Case 221

In the matter of the application of Continental Oil Company for an order granting permission to dually complete its "M.E. Wantz No. 3-D" well, located in the NW/4 SE/4 Section 21, Township 21S, Range 37E, N.M.P.M., Lea County, New Mexico, for producing gas from the Tubb sand, and oil from the Drinkard formation.

Case 222

In the matter of the application of Barnett and Rector for an order permitting the drilling of an unorthodox location 1370 ft. from the south line and 330 ft. from the west line (SW/4 NW/4 SW/4) of Section 20, Township 17S, Range 35E, N.M.P.M., along the northern limits of the Vacuum pool, Lea County, New Mexico.

Given under the seal of the Oil Conservation Commission of New Mexico, at Santa Fe, New Mexico, on May 9, 1950.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

/s/ R. R. Spurrier
/t/ R. R. SPURRIER, SECRETARY

SEAL

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice pursuant to law and the rules and regulations of said Commission promulgated thereunder, of the following public hearing to be held May 23, 1950, beginning at 10:00 o'clock a.m. on that day in the City of Santa Fe, New Mexico, in the Capitol (Hall of Representatives).

STATE OF NEW MEXICO TO:

All named parties in the following case and notice to the public:

Case 223

In the matter of application of Cooperative Producing Association for the establishment of a secondary recovery program on all of Section 31, Twp. 12S, R. 32E, N.M.P.M., Lea County, New Mexico.

Given under the seal of the Oil Conservation Commission of New Mexico, at Santa Fe, New Mexico, on May 10, 1950.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

/s/ R. R. Spurrier
/t/ R. R. SPURRIER, SECRETARY

SEAL

BEFORE:

R. R. Spurrier, Commissioner
Dan McCormick, Attorney for the Commission

REGISTER:

John A. Barnett
Roswell, New Mexico
For Barnett & Rector

Paul N. Colliston
Houston, Texas
For Continental Oil Company

Homer Dailey
Midland, Texas
For Continental Oil Company

H. W. Sanders
Ft. Worth, Texas
For Continental Oil Company

M. L. Patterson
Odessa, Texas
For Phillips Petroleum Company

Frank D. Gardner
Midland, Texas
For Sinclair Oil & Gas Company

R. L. Denton
Midland, Texas
For Magnolia Petroleum Company

Warren L. Taylor
Jal, New Mexico
For El Paso Natural Gas Company

Robert D. Fitting
Midland, Texas
For Fitting, Fitting & Jones for
Cooperative Producing Association

J. O. Denton, Jr.
Levelland, Texas
For Cooperative Producing Association

Paul Hallaway
Tatum, New Mexico
For Cooperative Producing Association

J. D. Duncan
Lubbock, Texas
For Delfern Oil Company

W. E. Bondurant, Jr.
Roswell, New Mexico
For Cooperative Producing Association

Roy Yarbrough
Hobbs, New Mexico
For the New Mexico Oil Conservation Commission

Wm. E. Bates
Midland, Texas
For The Texas Company

M. T. Smith
Midland, Texas
For The Shell Oil Company

E. E. Kinney
Artesia, New Mexico
For the New Mexico Bureau of Mines

C. D. Borland
Hobbs, New Mexico
For Gulf Oil Corporation

Glenn Staley
Hobbs, New Mexico
For Lea County Operators

Frank R. Lovering
Hobbs, New Mexico
For Shell Oil Company

Betty P. Wistrand
Santa Fe, New Mexico
For the New Mexico Oil Conservation Commission

Margaret Butler
Wooster, Ohio

Naomi W. Spurrier
Santa Fe, New Mexico

Beverly S. Woodworth
Santa Fe, New Mexico
For the New Mexico Oil Conservation Commission

George W. Selinger
Tulsa, Oklahoma
For Skelly Oil Company

T. F. Thompson
Tulsa, Oklahoma
For Skelly Oil Company

Ray Andrew
Santa Fe, New Mexico
For the New Mexico Oil Conservation Commission

COMMISSIONER SHEPARD: The meeting will come to order. We are ready to receive nominations to set the allowable.

MR. McCORMICK: I will call Elvis A. Utz and Ed Kinney as witnesses.

ELVIS A. UTZ, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McCORMICK:

Q. State your name, please.

A. Elvis A. Utz.

Q. Do you hold any position with the New Mexico Oil Conservation Commission?

A. Yes, sir, I am gas engineer for the New Mexico Oil Conservation Commission.

Q. Have you made a study of the market demand for oil in the State of New Mexico?

A. I have.

Q. Please state briefly what that study consisted of?

A. The U. S. Bureau of Mines extension pipe line runs, accrued storage, as much as could be found out, nominations of purchasers.

Q. Has the U. S. Bureau of Mines filed with the Conservation Commission an estimate of the market demand for the month of June 1950?

A. Yes, sir.

Q. What is that estimate?

A. 141,000 barrels.

Q. How does that compare with the estimate for May 1950?

A. The May estimate was 139,000 barrels, which is a 3½ per cent increase.

Q. Have you also received nominations from purchasers?

A. Yes, sir.

Q. Will you please read the nominations which you have received?

A. Would you like for me to read amounts?

Q. Yes, sir.

A. (Read nominations.)

Q. And what is the total of the nominations?

A. It makes a total of 129,290 barrels.

Q. How does that compare with the nominations for May?

A. That is a 1543 barrel increase.

Q. On the basis of all studies you have made, do you have an opinion as to the reasonable market demand for the entire

State for June 1950?

A. Yes, sir, I do.

Q. What is that?

A. 141,000 barrels.

Q. Of that total what part could be produced by the unallocated pools of Northwestern New Mexico?

A. Approximately 1,000 barrels.

Q. That leaves 140,000 barrels for Southeastern New Mexico?

A. That is correct.

Q. In your opinion, can all of the wells of Southern New Mexico produce 140,000 barrels per day without committing waste?

A. Yes, I believe they can.

Q. Is it necessary that the production of oil during June in the three southern counties, Eddy, Lea and Chaves, be allocated and distributed in order to prevent waste?

A. In my opinion it is in order to prevent waste.

Q. In your opinion, how should the 140,000 barrels per day for Southern New Mexico be allocated?

A. It should be allocated in accordance with present rules and regulations of the Commission.

Q. Do you have the regulations for the normal unit allowable for the month of June?

A. Yes, I do. That is 45 barrels.

Q. According to your calculations that will result in a total production for the southern counties of approximately 140,000 barrels?

A. That is right.

Q. If the Commission should adopt the normal unit allowable of 45 barrels, it would result in the total allocation of 140,000 barrels for southern New Mexico, in your opinion, would

such an allocation be fair and would protect correlative rights?

A. I believe it would.

MR. McCORMICK: Any questions by anybody.

(Witness excused.)

ED KINNEY, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McCORMICK:

Q. Your name is Ed Kinney?

A. Yes, sir.

Q. What position do you hold?

A. Petroleum engineer for the New Mexico Bureau of Mines.

Q. Have you made a study of the market and the producing capacity of wells in the State of New Mexico?

A. Yes, sir.

Q. Do you have an opinion as to what the reasonable market demand would be for oil for the month of June?

A. 141,000 barrels.

Q. In your opinion--strike that, please. Of that total what part would be produced from the northern part of the state?

A. 1,000 barrels per day.

Q. In your opinion can the pools of Southern New Mexico produce 140,000 barrels per day without committing waste?

A. Yes, sir.

Q. What is your recommendation as to the normal unit allowable?

A. The normal unit allowable should be 45 barrels.

Q. That normal unit allowable would give 140,000 barrels per day in the southern part of the state?

A. Yes, sir.

MR. McCORMICK: Any questions? That is all.

(Witness excused.)

COMMISSIONER SPURRIER: If there are no further questions, we will proceed to Case 220.

(Mr. McCormick read the notice of publication of Case 220.)

MR. SELINGER: George W. Selinger for Skelly Oil Company. We have one witness, T. F. Thompson.

T. F. THOMPSON, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. SELINGER:

Q. State your name, please.

A. T. F. Thompson.

Q. And you are associated with what company?

A. Skelly Oil Company.

Q. In what capacity?

A. Superintendent of unitization.

Q. As such are you familiar with the two leases owned by Skelly Oil Company described as the south half of the southeast quarter of Section 2, Township 23S, Range 36E?

A. I am.

Q. Those two leases are what has been defined by the Oil Conservation Commission as the Langlie-Mattix oil field, is that correct?

A. I believe that is correct.

Q. In the immediate vicinity of the applicant's two leases there are quite a number of gas wells drilled?

A. Yes, sir, there are.

Q. Now, it is the applicant's intention to drill gas wells on its leases, is that correct?

A. We do.

Q. Now, the two leases are 80-acre leases running east and

west and adjoining each other, is that correct?

A. That is right.

Q. They are not located in the same governmental quarter section?

A. No, they are not.

Q. Now, Mr. Thompson, has the applicant attempted since August 1948 to form a unit which would comprise the southeast quarter of Section 2 and also a unit comprising the southwest quarter of Section 2 for the purpose of drilling gas wells?

A. We have drilled two gas wells.

Q. Now, will you relate to the Commission the circumstances in your attempts to form such a unit?

A. The lease covering the north half of the south half of said Section 2 is owned by Shell Oil Company, that is, as to the records of the Land Office. That lease is subject to a contract originally entered into between Shell and Western Gas Company which is now El Paso Natural Gas Company. Shell under their contract retained all oil rights, conveying gas rights to Western. As a result when we tried to negotiate with the record owner of the lease on the Land Office records, which was Shell Oil Company, however, when we were furnished with a copy of the contract, evidencing ownership of El Paso Natural Gas Company's gas rights, that presented a considerable problem. This unit would have to be approved by the Commissioners before it could be organized.

Q. You mean the Land Commission?

A. Yes, sir.

Q. What you are saying is that the Shell Oil Company, which owns the 160 lying north of the applicant's 160, [illegible]

owned the oil rights, and Western or El Paso Natural Gas Company had control of the gas rights?

A. That is correct. We submitted contracts to Shell and El Paso in an attempt to work out a unit first in the southeast quarter of Section 2 for their approval, and they decided in lieu of the complicated set of contracts such as we submitted they would prefer to convey the lease in its entirety to El Paso and have the assignment approved by the Land Office, which they did. That took considerable time. In the meantime, we were negotiating with El Paso and thought we had a contract worked out when the question arose as to where the well would be located. The lease was still subject to the contract with Shell, consequently, we preferred to drill on our acreage for the reason should it turn out to be an oil well, we would retain the oil rights. They naturally preferred to drill on their acreage for the same reason. Both of us were to bear half of the cost of the well and half of the dry hole risk.

Q. Did you not encounter difficulty in securing the proportionate part of the cost of the well because the Shell Company owned the oil rights and the El Paso Natural Gas Company owned the gas rights. You consequently didn't know which of the two parties owned one half interest in the proposed well until after its completion as to whether it was an oil or a gas well?

A. That is if we were to drill on the Shell acreage.

Q. Therefore, you were unable to work out a satisfactory deal with both Shell and El Paso because of the divergence between oil and gas well on the original unit as it would be entirely possible to get either one, and the diversity of ownership on the north 80 made it virtually impossible?

I ask you, Mr. Thompson, after negotiations whether or not the Shell Oil Company and El Paso Natural Gas Company both agreed that it would be virtually impossible to work out a proper program for drilling?

A. Our negotiations were mainly with El Paso Natural Gas Company, as I feel this is a gas unit, after the lease was conveyed to El Paso. We had no further negotiations with Shell. El Paso did attempt to persuade Shell to withdraw that particular arrangement from that contract so we could proceed. In our conversations with El Paso we came to a point where we felt we couldn't continue the negotiations on any equitable basis. They agreed that if we could form a unit of all Skelley acreage in that manner, we would both work out units and drill without an operating contract. So that Shell and El Paso as to the remaining acreage in the south half of Section 2 can a similar 160-acre unit, and they will be able to drill one well on a location on their acreage.

Q. What was another difficulty which arose on the Shell contract, whether the well would be oil or gas?

A. That is right. We didn't want to enter any contract which would bring our acreage subject to the Shell El Paso contract. We felt there were certain inequities which we didn't want to assume.

Q. You preferred to come to the Oil Conservation Commission to establish to proper classification of the well?

A. Yes, sir.

Q. These two applicant's leases are State leases, are they not?

A. Yes, sir.

Q. What are the numbers?

A. The south half of the southwest quarter is covered by State B-7776. The south half of the southeast is covered by B-1327.

Q. Now, Mr. Thompson, if the Oil Conservation Commission approves the formation of this unit as requested by the applicant, it will then be submitted to the Commissioner of Lands?

A. Yes, sir.

Q. If he approves of it, then the applicant proposes to drill a well for gas in the center of the east half of the south half of the south half of 2?

A. That is correct.

Q. Now, we have drawn a plat showing the applicant's lease outlined in red and the immediate vicinity of the applicant's Lease?

A. Yes, sir.

MR. SELINGER: I offer Application 220 Exhibit 1 in evidence.

COMMISSIONER SPURRIER: It will be accepted.

MR. SELINGER: That is all of this witness. I have a short concluding statement which I would like to make.

MR. McCORMICK: Have these two State leases been validated by production?

A. Yes, sir, they are both held in force which is by production.

MR. McCORMICK: From what zone are these other wells producing gas?

A. The gas horizon is in the neighborhood of 3,000 feet, anywhere from 2980 down to 3625. The wells are recognized gas wells in this immediate area.

Mr. McCORMICK: Mr. Selinger, have you had any comment from Shell as to where they propose to drill a well on the north half of the south half?

MR. SELINGER: No, sir, my original application intimated that they would drill. I have found upon investigation that they have no idea where either Shell or El Paso will drill. We don't know who intends to drill.

MR. McCORMICK: Mr. Lovering, could you add anything to the record on this?

MR. LOVERING: I might by way of clarifying the situation. The situation does look a little complicated. Shell did acquiesce on this deal and so conveyed the gas rights to El Paso on an old time agreement. As far as unitization of gas rights, it was entirely with El Paso, not with Shell. I don't think we have any intention of drilling an oil well there.

MR. McCORMICK: Mr. Lovering, what is the history of the wells in that area, start with gas and later turn into oil wells?

MR. LOVERING: They are practically all gas wells. In most any, you get a little oil, but none that is commercial. You see the complication arises by virtue of the fact that this location being right on the line between two forties. If it produces an oil well, there would be complications, if it is a gas well, there would be no complications. However, if they got an oil well, they could produce the well as a gas well from the gas zone. As far as gas is concerned, there is no complication unless it is with El Paso, not so far as Shell is concerned. I would like to ask one question. If the request is granted, will it be necessary for Shell or El Paso to ask for another hearing for them to drill on their 160 acres.

MR. McCORMICK: Is this north half and south half all one

basic lease, is the north half and the south half part of the State basic lease?

MR. SELINGER: The north half of the south half of 2, Mr. Thompson has that?

A. Yes, sir. That is State Lease B11167.

MR. McCORMICK: If it is all one basic lease, I know that you would have to apply for an order from the Commission.

MR. SELINGER: That would be according to locations, if in the center of 80 or if in the center of 40.

MR. McCORMICK: I don't think the Commission would want to commit itself on that question before it comes before it.

MR. SELINGER: I would like to state that applicant's intention to drill the proposed well in the center of 80 acres for the reason that we are attempting to secure as nearly as possible the approach to the center of 160 acres under the rules. This would be 660 feet from the south and east lines of our leases. In that event the location of the farthest west limits of the unit would be almost 7-8 of a mile, and be located 1320 feet from our east line. It cuts the west limits of the unit down 3900 feet approximately. If you will note the Texas Pacific Coal & Oil Company well to the immediate south which is located 660 feet from the north and east line of their lease. The unit that is assigned to that well comprises the northeast quarter of Section 11. The furthermost point of the unit is approximately 3100 feet from the well to the line. And we felt by locating in the center of 80 acres, approaching quarter section with well located 660 feet out of corner. Other measurements, the closest Tidewater gas well located in the southwest of one, and T.P.C. & O.

No. 16 located in the northeast of 11 is a distance of 1732 feet from Tidewater No. 1 well in the southwest of one, and Continental Clay No. 1 in the northwest of 12 is 1898 feet. You will notice the gas wells listed on Exhibit 1 are spaced at various intervals from 660 feet to 990, and in some instances 660 and 990. The application proposes the location of 660 and 1320. I might also add there are some 20 gas wells in nine sections immediately adjoining section 2, and the nearest oil well is a mile and a half to the east, so it looks like the applicant will get a gas well and not an oil well. However, like the Commission, we can't foretell in the future until these things are presented to us.

I might further add that we dealt with the Shell prior to the time that they assigned the gas rights to El Paso, and subsequent to that we have dealt with El Paso, and regardless of whether the Shell approves or disapproves, we still don't want to come under that contract in regard to the operations and all mechanics of drilling the well. That is the reason why we desire to drill on our own acreage. That is all.

COMMISSIONER SPURRIER: Do you have any thought on why the well shouldn't be located in the center of two eighties?

MR. SELINGER: Yes, we feel that the location of our well on the south 160 in the center of this particular 80 would enable the Shell or El Paso whoever drills their well to drill and leave enough space between the two wells which would be in excess of 1320 feet.

COMMISSIONER SPURRIER: Specifically what location do you mean if Shell should drill a well?

MR. SELLINGER: Well, by the location of our well as proposed short of a similar location on the east half of their 160.

any location in excess of 660 feet from their line would put a distance in excess of 1320 feet between the two gas wells, and we felt that was pretty good latitutde to enable Shell or El Paso to put a gas well on their acreage and still be in excess of 1320 feet from our well.

COMMISSIONER SPURRIER: Mr. Thompson, do you know the size of Sinclair Clay No. 4 located in the northeast quarter of Section 3?

A. I made no study of the size of those.

MR. SELINGER: The west half of Section 35 contains 320 acres.

MR. McCORMICK: You want the size of the well?

COMMISSIONER SPURRIER: Yes, how much each will produce or has produced?

MR. SELINGER: Sinclair Clay No. 4 is a sixteen million foot gas well. Gulf Well in the northeast of 2 is a nine million foot gas well. Do you want the perforations?

COMMISSIONER SPURRIER: Do you know the initial dates on those?

MR. SELINGER: I don't know initial dates. I would say that they are comparatively new wells, within the last year.

COMMISSIONER SPURRIER: Do you think, if you would care to give an opinion on geology, Mr. Selinger, do you think that you will get a well in the west half of that lease?

MR. SELINGER: I don't know whether we would get a good well, but you will notice that there are producing wells in every direction except straight west. The Sinclair well is a producing well, and the only acreage is to the west, and no one has any information on that. We know that we are surrounded on three sides with producing gas wells. The limits to the Langlie-Mattix Field, so-called, is in an area where gas wells are located, and the limits have not be defined. There are no dry holes.

COMMISSIONER SPURRIER: Does anyone have any further comments in regard to this application?

MR. LOVERING: On behalf of Shell Oil Company, we have no objection to this application.

COMMISSIONER SPURRIER: If there are no further questions, the witness is excused and the case is closed.

(Mr. McCormick read notice of publication of Case 221.)

HOMER DAILEY, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. H. W. SANDERS:

Q. What is your name?

A. Homer Dailey.

MR. SANDERS: Before I qualify Mr. Dailey, I would like to make a short statement to tell you what we propose to do in the dual completion of this particular well. As the application has stated, we want to dually complete this well to produce gas from the Tubb sand and oil from the Drinkard pool.

This well was drilled for an oil well and completed as an oil well, and then we were offset on the north by the Trinity Drilling Company with a gas well. If will note when you offset with an oil well and get a gas well, the question naturally arose, why couldn't we dually complete this well. When Trinity drilled the second well, they did not intend to drill a gas well. They drilled to test to the Ellenburger. When they tested to the Ellenburger, they got no production and plugged back and completed the well as a gas well. Now, it is up to us to meet offset obligations. We propose to produce the gas through the annulus between the casing and tubing with proper packer and wellhead connections to prevent co-mingling.

Of course, if we are allowed to complete the well dually, we will effect a saving of approximately $65,000.00. It would

cost $75,000.00 to drill a gas well. It will cost about $10,000.00 to dually complete this well.

Q. Mr. Dailey, you have never qualified before the Conservation Commission, have you?

A. No, sir.

Q. Will you state your name?

A. Homer Dailey.

Q. Where are you employed?

A. By Continental Oil Company, Midland, Texas.

Q. In what capacity?

A. Division engineer for west Texas, and the New Mexico division.

Q. Did you attend college?

A. Yes, sir, New Mexico School of Mines, graduated in 1935 as mining engineer.

Q. Have you practiced your profession since that time?

A. I have worked for Continental since February 1936 with the exception of three years spent in the Army.

Q. As mining engineer?

A. Most of the time, yes, sir.

Q. Are you acquainted with the geological formations in southern New Mexico?

A. Yes, sir, I am.

Q. Have you worked with them?

A. Yes, sir, I have supervised the completion of wells for Continental Oil Company for the last three years for sure, and several years prior to that.

Q. Now, will you give a description of the Mary E. Wantz Lease?

A. The Mary E. Wantz Lease consists of 280 acres of patented

land in Sec. 21, T-21-S, R-37-E, Lea County New Mexico. The lease has two producing wells in the Penrose-Skelly pay operated by the Trinity Drilling Company. There are also four producing wells in the Drinkard, two in the Hare Pool (McKee Sand) and two in the Brunson Pool (Ellenburger) all operated by the Continental Oil Company. Since these oil producing horizons are recognized as separate reservoirs, the remaining portion of this testimony concerns only the "Drinkard Sandy Member" and Lower Yeso. One thing I should note here on this map the only wells shown with but two exceptions are Drinkard wells. The two exceptions are the Trinity Weatherly No. 1 which is producing from the Tubb Sand, and Continental Wantz No. 2S, which is from Tubbs on drill stem test.

Q. Now, will you discuss the producing formations?

A. In Bulletin No. 29, published by the New Mexico Bureau of Mines and Mineral Resources, the author, E. Russell Lloyd, has divided the Yeso formation into four parts. These are Upper, Middle, Drinkard Sandy Member and Lower. The Drinkard Sandy Member is also commonly referred to as the"Tubb Sand." To avoid confusion "Tubb Sand" is used here.

Between the top of this sand and the base of the Drinkard pay horizon there is approximately 600 feet of formation. This can ge divided as follows: 1. Tubb, 160 feet, chiefly sand and sandy dolomite. 2. 150 feet of dolomite to the top of the Drinkard. 3. 300 feet of Drinkard pay horizon, chiefly lime and dolomite. Oil and gas accumulation being mainly in the bottom 200 feet.

A number of drill stem tests on wells in the area have shown the presence of gas in the lower portion of the Tubb Sand.

A north offset to the Wantz No. 3-D was completed in this section for a potential of 6,000 MCF gas per day. While drilling a well, the Wantz No. 2-S, to the McKee Sand, one location south of the Wantz No. 3-D, the Continental Oil Company took a drill stem test of the Tubb Sand. During the test the section produced gas at the rate of 4,300 MCF per day.

The Wantz No. 3-D plus three direct and two diagonal offsets are producing oil from the lower 200 feet of the drinkard.

Electrical logs, sample analysis and drill stem tests all indicate the 150 feet of dolomite between the base of the Tubb Sand and the top of the Drinkard to be mainly dense and barren. The Continental Oil Company's Wantz No. 1-S was cored through the Drinkard section. The core analysis of the top 30 feet showed no permeability while the next 70 feet showed only a few scattered feet with permeability.

This information all indicates that the Drinkard pay and the gas horizon in the Tubb Sand are separate reservoirs.

Q. Mr. Dailey, would you say that there is a natural, impenetrable barrier between the Tubb Sand and the Drinkard Pool?

A. That is correct.

Q. In this particular well?

A. I would say in this entire area surrounding the well.

MR. SANDERS: I would like to offer Applicant's Exhibit 1, which is a plat showing Continental Oil Company Wantz No. 3-D and Offset Wells, in evidence.

COMMISSIONER SPURRIER: It will be received.

Q. You have there a copy of Applicant's Exhibit No. 2, is that a radioactivity log of the well?

A. Yes, of both of 6,000 feet to the total depth.

Q. Would you describe it to the Commission?

A. On this portion of the radioactive survey, this includes the section under discussion here. It is on top of the Tubb Sand located at 6050 feet. The top of the Drinkard on this is located at 6345 feet. The main porosity and permeability start at 6500 feet. The section which we propose to complete in and which carries gas is located between 6120 feet and 6195 feet. That has been located by correlation from the Trinity Well in the north and Continental Oil Company Wantz No. 2-S to the south.

Q. What is the total depth?

A. The well was drilled to 6630 feet, and a 7 inch casing was set at the total depth.

Q. Will you give well and offset data?

A. The Wantz No. 3-D was completed January 7, 1948 for an initial potential of 240 barrels oil per day. This production was through casing perforations in the Drinkard pay at 6546-53, 6558-64, 6568-73 and 6580-84 feet.

On February 9, 1950, the well tested 32½ barrels oil in 4½ hours. Cumulative production as of April 1, 1950, was 32,080 barrels.

Q. Would you describe the setting of the 7-inch casing.

A. The well casing was set at the total depth and cemented from approximately 3800 feet.

Q. It was cemented from 3800 feet to the bottom?

A. To the depth, yes, sir.

Q. In this method of cementing the casing, do you have any opinion whether co-mingling outside the casing is possible?

A. I do not believe it is possible. The 40 acre unit offsetting the Wantz 3-D to the north is operated by the Trinity Drilling Company. It contains two wells, one producing oil from the Drinkard and the other gas from the Tubb Sand. The Trinity Drilling Company's M. Weatherly No. 7 was completed February 5, 1948, for an initial potential of 228 barrels oil per day. This was from the Drinkard through perforations at 6516-28, 6534-58 and 6566-84 feet. During March 1950, this well produced 1,692 barrels. The cumulative production to April 1, 1950, was 58,771 barrels. The Trinity Drilling Company's Weatherly No. 1-E was completed April 27, 1949, for an initial potential of 6,000 MCF gas per day. This was from the Tubb section through perforations 6143-53 and 6158-80 feet. During March 1950, the well produced 38,612 MCF gas plus approximately 1,250 barrels distillate. Cumulative production to April 1, 1950 was 78,080 MCF gas and 2,378 barrels distillate.

The east offset to Wantz No. 3-D is the Gordon Cone, Anderson No. 1. This well was completed April 29, 1948, for an initial potential of 446 barrels oil per day from the Drinkard through perforations 6510-35, 6550-80 and 6590-28 feet. During March 1950, the well produced 2,092 barrels of oil. It had a cumulative production as of April 1, 1950, of 60,814 barrels.

The west offset is Continental Oil Company's Wantz No. 4-D. It was completed for an initial potential of 360 barrels oil per day on August 25, 1948. It was completed in the Drinkard through perforations 6570-6602 and 6630-40 feet. During March 1950, the well produced 943 barrels of oil. The cumulative production as of April 1, 1950 was 19,842 barrels.

Q. Now, I would like for you to tell how you propose to dually complete the well?

A. The proposed method of dual completion will prevent commingling of the Tubb Sand and Drinkard production inside the casing. Separation of production from the two zones will be accomplished by means of a Baker Model "D" retainer type production packer. This packer was designed for dual completion work and is capable of withstanding a differential pressure of 2,000 pounds per square inch. The packer has two sets of slips which set in the casing. After both slips have been set and the packer rubber has been expanded against the pipe, it is impossible to move the packer up or down and it can be removed only by drilling it out.

Q. Mr. Dailey, in order to expedite this, I would like to ask what the copy of Applicant's Exhibit No. 3 is?

A. This is a diagram of the packer, Baker Model D Production Packer.

Q. In your opinion will the use of the Baker Packer in the casing keep the two formations from commingling?

A. That is correct, it will.

MR. SANDERS: I offer Applicant's Exhibit No. 3 and also Applicant's Exhibit No. 2 in evidence.

COMMISSIONER SPURRIER: They will be received.

Mr. Dailey, excuse me, but can you tell what the effect will be with respect to formation pressures?

A. Not yet. The static bottom hole pressure of the Drinkard pay in the Wantz No. 3-D was 1,502 pounds in November 1949. It is estimated that the flowing bottom hole pressure is greater than 700 pounds. The Tubb Sand is expected to have a static formation pressure of 2,400 pounds per square inch.

COMMISSIONER SHEPARD: What is that based on?

A. That is based on the bottom hole pressures from the shut-in drill stem test pressure on Wantz No. 2-S which was 2,377 pounds.

Q. What has been the history of differential pressure?

A. The maximum differential pressure across the dual completion packer would occur when the Drinkard pay was producing oil and the gas horizon was shut in. Under that condition a differential of 1,700 pounds would exist. This is below that for which the packer is designed.

Q. If we are permitted to complete dually, would both horizons be produced to depletion?

A. That is correct. The Drinkard oil will be flowed through the 2½ inch tubing. When natural flow ceases, it will be possible to pump or gas lift the remaining recoverable oil. The gas horizon is expected to flow to depletion through the annulus.

Q. What is the estimated cost to drill a gas well?

A. Approximately $75,000.00.

Q. How much will it cost to dually complete this well?

A. Approximately $10,000.00

MR. SANDERS: That is all we have.

MR. McCORMICK: Have you any other dual completions in the Drinkard Pool?

A. Noth that I know of.

MR. McCORMICK: Does the lower Drinkard produce much gas along with oil?

A. It varies;in that particular well very little gas. The ratio is twenty and thirty thousand.

MR. McCORMICK: What is the ratio of the third well?

A. I do not have it. It is approximately 1800.

MR. McCORMICK: Among petroleum engineers are dual completion

of gas and oil formations now generally thought to be practical and effective?

A. Most everybody that I have talked to seems to feel that way.

Q. Has the method been improved recently?

A. It has definitely been improved. This particular packer has not been out very long.

MR. McCORMICK: You think that there would be no commingling from the lower Drinkard with the gas from the Tubbs?

A. That is correct.

MR. McCORMICK: Would it be possible for any of it to commingle?

A. You mean between the Tubbs and Drinkard. No, I don't see how unless the tool failed.

MR. McCORMICK: If it failed, you would know it very soon?

A. It would be possible to take periodic pressure tests and be able to determine that.

MR. McCORMICK: Do you intend to take such tests if you are granted this permit?

A. That is correct.

COMMISSIONER SPURRIER: Any further questions of this witness?

MR. LOVERING: I would like to know whether Weatherby No. 7 is an orthodox location?

A. Well, as an oil well, it would.

MR. LOVERING: As a producing gas well, I wonder whether as an unorthodox location whether they requested permission to produce the unorthodox gas well?

A. I don't--

MR. LOVERING: I think it is unorthodox in that it doesn't meet the 660 requirements?

A. It was completed in April 1949.

MR. LOVERING: I think some thought should be given to the future exploitation of the gas reservoirs in this particular area, especially inasmuch as I didn't hear any request for designation of the unit, size of the unit, what allowable they expect for gas in that location, how it would affect offset operators--one has a 40 and one has an 80-acre tract. Has there been any thought given to the formation of units for this gas reservoir?

MR. McCORMICK: That is a 40-acre unit throughout Lea County.

MR. LOVERING: That doesn't help the situation if we have double or triple production for every 40 around there. What is to prevent them if we don't devise a set unit allowable?

MR. McCORMICK: There never has been a gas pool defined in Lea County yet. That is what is causing everyone to get gray hair down there figuring out how to define one.

MR. LOVERING: You have gas field defined by the nomenclature committee in other parts of the State. I think it is time to so name them before going ahead with a program of this kind. There may be a lot of complications.

COMMISSIONER SPURRIER: 40-acre units would get a 40-acre allowable.

MR. LOVERING: I would like to know what you would base that on--40 or 120 or what?

MR. McCORMICK: Until such time as gas if prorationed, that isn't the problem, is it?

MR. LOVERING: There will be no proration of gas?

MR. McCORMICK: There isn't yet.

COMMISSIONER SPURRIER: There will be.

MR. LOVERING: Won't in future exploitation there be more

operators not included in any such unit?

COMMISSIONER SPURRIER: That is a good question.

MR. SANDERS: There is no gas proration so that isn't being considered here.

MR. McCORMICK: Do you have a market for the gas?

A. We intend to use it for our lease operations.

MR. McCORMICK: And pay the royalty commensurate with the field price?

A. I don't know exactly how that works where it is used on the lease operations. It is then sold to a gasoline plant.

COMMISSIONER SPURRIER: Will you speak louder, please?

A. I said it would be used to operate the lease and then sold to a gasoline plant, and of course the royalty owners will receive their royalty.

MR. McCORMICK: Dry gas?

A. Yes, that is all sold.

Q. When you say lease operations, you mean gas lift?

A. Yes, sir.

Q. You don't mean drilling?

A. We mean for gas lift.

COMMISSIONER SPURRIER: Does anyone have any further questions. If not, the witness is excused. Proceed to the next case.

(Mr. McCormick read the notice of publication for 222.)

JOHN A. BARNETT, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McCORMICK:

Q. State you name, please?

A. John A. Barnett, representing Barnett & Rector, Roswell, New Mexico.

Q. Go ahead and state your case.

A. We propose to drill an unorthodox location along the northern edge of the Vacuum pool, Lea County, New Mexico. The proposed location is 1370 feet from the south line and 330 feet from the west line of Section 20, Township 17 south, Range 35 east. We have already completed our State No. 1-F well, on the same lease, at a location 330 feet from the south line and 660 feet from the west line of Section 20; initial production was 72 barrels of oil per day, swabbing and flowing. We know that a location to the north should be structurally lower, and it is believe that a regular location on the north 40 acres of our lease might prove non-commercial. The proposed location does not crowd or involve any outside operators. The entire west half of the southwest quarter of Section 20 is a part of State Lease B-2245, and the leasehold rights above 5000 feet are held by Barnett & Rector, under a farmout from the Ohio Oil Company. No objection is offered to the proposed location by The Ohio Oil Company. Barnett & Rector also hold the leasehold rights above 4800 feet on the offsetting acreage to the west; this is a part of State Lease B-1393.

From my experience in drilling about six wells in this immediate vicinity, it appears that local conditions involving two things. First, that the wells are all small and more or less marginal in nature; and second, subsurface conditions vary materially from one location to another, making it quite apparent that one well will not consistently and adequately drain 40 acres. If our proposed well were to be drilled in the center of the north 40 acres of this tract, we would probably get some sort of a small, probably non-profitable well. Inasmuch as the proposed location would be something in excess of a

a thousand and forty feet from the one well producing on the lease, I do not consider that this distance would cause drainage from one location to another or interference of production of one well by another. As a matter of fact, in drilling an orthodox location, our State No. 1-F on this lease is only 990 feet from our State No. 2-C well offsetting. In other words, in drilling this unorthodox location we would have a greater distance from any producing well than any two orthodox locations now producing.

Q. Who owns the lease immediately to the east?

A. Phillips Petroleum Company.

Q. Have they any wells to the east of you?

A. No.

Q. Were they given notice by registered mail of this hearing?

A. I do not know. However, they are, of course, 990 feet from this location. In other words, the only crowding would be ours on this same lease. We are not crowding any offset operators.

Q. Do you think you should have full allowable if you get a well capable of producing that?

A. I do, because of the geological conditions of the area. As I mentioned, it is very evident that one well does not drain 40 acres as proved on the sketch attached to the notice. The producing formation to the west of State 1-C is not present in any other of the four wells shown on the sketch, except 2-C. The drilling has been checked by steam core tests in the past two years in the immediate vicinity and leads one to believe that one well will not drain more than if as much as 20 acres in this area.

MR. McCORMICK: In essence you are asking for two allowables from one 40-acre tract?

A. No, the two allowables for an 80-acre tract; the allowable for the northern portion.

MR. McCORMICK: The well would be 50 feet from the boundary of the 40?

A. 50 feet, that is correct. Under the circumstances, it is quite likely that the northern 40 is non-productive. If our southern tract is not being drained unless we do drill the well, and since the proration is set up on the basis of the 40-acre unit.

COMMISSIONER SPURRIER: If you aren't permitted to drill the unorthodox location, would you drill an orthodox location on that 40?

A. I don't believe I would. The wells in thos whole area have been small, marginal in nature, and I would hesitate to drill on a location which I do not believe would yield oil necessary to make it a profitable venture.

MR. McCORMICK: Is 1-F well flowing?

A. Yes, sir.

MR. McCORMICK: What others are flowing or pumping?

A. State 2-C has just been completed and is flowing. State 1-F was only completed a short time, and we have just managed to keep is flowing so far with additional assistance of it having to be swabbed off about 8 or 10 times. I question if it will be flowing two months from now. State 1-C is pumping. State 1-A is still flowing, but it is in such condition that it appears that it will have to be put on the pump very soon.

COMMISSIONER SPURRIER: Does anyone else have a question.

MR. LOVERING: Just one question. I would like to know how

much of that area, that 40, that the witness considers productive?

A. There is probably some oil under the entire 40, but the northern portion would, I think, be so tight that it would be very, very difficult to ever effect profitable recovery from it.

MR. LOVERING: On what basis do you assume that one well will not drain more than 20 acres?

A. As I mentioned, of course 20 acres is more or less arbitrary, by reason of the fact you have wells a quarter of a mile apart and less in this area which do not carry any oil in the same formation. From the samples we are never able to determine minimum production from tests whether it would make a barrel of oil a day.

MR. LOVERING: What I gather by inference what the applicant has here within a good lease a non-productive one, 50 feet from the unit, only 1/16 of that 40 acres is productive.

A. That may not be the case.

MR. LOVERING: There are complications which might arise if you allow crowding of a unit within 50 feet. In the Ellenburger fields you find considerable faults which might come inside 75 or 100 feet required. If you permit drilling 50 feet from the boundary of the unit to tap the reservoir trapped against that fault. The idea you get is that you are allowed to tap that reservoir and allot the 40-acre allowable knowing that 3/4 of the 40 is non-productive, tapping the reservoir and getting oil which was not in place in the lease.

MR. McCORMICK: In place under another 40 of the same lease?

MR. LOVERING: Perhaps. I would like to state that Shell Oil Company has no objection to this particular location. What I was concerned about is that close crowding of the unit lines

and what affect it will have in the future as so much there is Ellenburger fields.

COMMISSIONER SPURRIER: Thank you, Frank.

A. By drilling in this location it is anticipated that we will recover oil which probably would never otherwise be recovered, and at the same time not drain any oil from offset leases or offset operators. The actual drainage, which none of us can definitely determine, will probably be from the corner portion of the north 40 and possibly the north portion of the south 40. The acreage of the north 40 will undoubtedly yield some oil from a good portion of that acreage, but it would be at so slow a rate and over such a long period of time [illegible] the well in the center of that 40, it probably wouldn't be fast enough that any of us would live long enough to recover the oil to make it feasible and economical.

COMISSIONER SPURRIER: Does anyone have any further questions? If there is nothing further, we will recess until 1:30.

(Noon recess.)

COMMISSIONER SPURRIER: The Commission is now in session. We will proceed to Case No. 223.

(Mr. McCormick read the notice of publication of Case 223.)

MR. BONDURANT: W. E. Bondurant, Jr., Roswell, New Mexico, appearing on behalf of the applicant, Cooperative Producing Association. First there is what we lawyers like to call two typographical errors in the application. On page 1, paragraph 1, line 10, where it says "State B" it should be "G". Then in the paragraph 3 on page 2 the location of the intake well should be the NE corner of the SW¼ of the NE¼. The location is correct on the map. It is wrong in the application.

The applicant is the owner of some thirty-seven wells in the Caprock Field in Lea and Chaves Counties, New Mexico; in

addition to that it operates six wells owned by Phillips Petroleum Corporation and one well owned by Mid-Continent Corporation; the total operation of about 44 wells.

This particular application is in reference to that certain oil and gas lease No. B-9676 from the State of New Mexico covering all of Section 31, Twp. 12S, R. 32E, Lea County, New Mexico. These wells are producing from the Artesia Red Sand, and production has shown constant decline, which has reached serious proportions. On this one section we operate thirteen wells, and the well which is listed as State / in the application has shown a monthly decline of approximately 3.25 per cent per month, and the decline for the wells in this group shows a decline of about 4.15 per cent. Due to that it has become essential institute some type of secondary recovery program. The applicant hired the firm of Fitting, Fitting & Jones, Petroleum Engineers, from Midland to survey the field. They recommended a secondary recovery program consisting of air injection and they estimate that if the system or program proves successful, it will be possible to recover an additional 20 to 30 per cent of oil in place.

J. O. DENTON, JR., having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. BONDURANT:

Q. State your name please.

A. J. O. Denton, Jr.

Q. Where do you live, Mr. Denton?

A. Levelland, Texas.

Q. Are you connected with the applicant, Cooperative Producing Association?

A. Yes, sir. I am manager.

Q. How long have you been with that Association?

A. Since September 1945.

Q. Mr. Denton, for the benefit of the Commission, how long have you been in the oil and gas business?

A. Approximately 25 years.

Q. Now, did your company buy some producing property in the Caprock Field in Lea and Chaves Counties?

A. Yes, sir.

Q. When?

A. September 1945.

Q. How many wells do you own there, Mr. Denton?

A. We own 37 wells.

Q. Do you operate any other wells?

A. We operate six wells for Phillips Petroleum Corporation and one well for Mid-Continent in addition to what we own.

Q. Just give a rough estimate, Mr. Denton, as to what per cent in the Caprock Field, you are operating?

A. Approximately 30 per cent.

Q. Now, are you familiar with the production history from those?

A. I think I am.

Q. Will you state the bottom hole pressures?

A. In 1945 on the property that we purchased was between a thousand and eleven hundred pounds. In 1946 one well that was drilled in this field was in excess of 1200 pounds. The wells produced in 1945 that we purchased approximately 30,000 barrels of oil per month. Today they are producing the wells we own at approximately 14,000 barrels per month. The bottom hole pressure is not in excess of 300 pounds on any one well.

Q. Is that good or bad?

A. That is a bad situation.

Q. Did that situation lead you to take some curative action?

A. Yes, sir.

Q. And what have you done, Mr. Denton?

A. We employed Fitting, Fitting, & Jones, Petroleum Engineers, a consulting firm.

Q. Have they made a survey?

A. They made a survey of the field, and cataloged the information which they have obtained recently with the information obtained for the past two years and made us a recommendation.

Q. What was the nature of that recommendation.

A. The recommendation is to inject air into the well in Section 31 and intermittently slug it with water to prohibit channeling.

Q. How many wells in Section 31?

A. Thirteen.

Q. That is an oil and gas lease from the State of New Mexico?

A. Yes, sir, Lease B-9676.

MR. BONDURANT: Would the Commission like to ask Mr. Denton any questions?

MR. McCORMICK: Not at this time.

(Witness excused.)

ROBERT D. FITTING, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. BONDURANT:

Q. What is your name?

A. Robert D. Fitting.

Q. With what firm are you connected?

A. Fitting, Fitting & Jones, a consulting engineer and geologist firm.

Q. What is your education?

A. I graduated from Stanford University in 1939. I worked in Goldsmith as a petroleum engineer for a year and a half before I entered the Navy. When I came back, I have worked as a consultant since that time, since '45.

Q. Now, was your firm retained by the Cooperative Producing Association to make a survey of the Caprock Field?

A. Yes, sir, December 1947 we put in our first appraisal, report of oil, at the request of the Cooperative, what they could expect at that time. It was evident to us that something should be done as it was losing bottom hole pressure. The average volumetric analysis did not totally agree with the bottom hole pressures nor the production decline. Due to the fact that they had recently made a pipe line connection, we couldn't make any definite recommendation at that time.

Q. State in a little more detail what the reason was that you were hired to make that survey?

A. Their primary purpose was that production was falling off, and they wanted to see what they could do about it. They didn't realize that it was as serious as it ultimately indicated that it was. Subsequent to the report after the engineers had completed it, they conferred with all operators and members. We took bottom hole pressure surveys, instigated tests, took core analysis, gas analysis, water analysis and any research that we could use for secondary recovery. That engineering committee met six, I believe, six or seven times. When we were able to get field wide general pressure surveys which substantiated the ideas we had on the original decline. Bottom hole pressures were declining rapidly. Production by the first part of this year indicated definite production decline.

One completely reliable source has indicated by production decline c of approximately 1/3 less than that shown by the volumetric analysis. The pressure decline in the reservoir was again 1/3 of production decline. The analogy was again apparent that something should be done before we lost all reservoir energy, before it was all depleted. The proposition was made to the engineers' committee to determine what type of reservoir energy it was. It was apparent to most of us that it was some sort of solution drive--some water production, the pressure of volume of withdrawal does not indicate a water drive reservoir. The amount of water available from wells producing water is not sufficient to use for secondary purposes. We had one on the San Andres; it again did not have enough water to be used for secondary recovery. The problem of gas injection was thoroughly looked into. We have neither sufficient quantities of gas or gas of the nature that could be put back into the formation. That left only one way which was available, and that was air.

We went to the background of air injection, how it is worked, the mechanics of it so as not to create any detrimental effect to the reservoir. We found that with the slugging of water that it was far superior to the injection of air alone. It was on the basis of that that we made the recommendations to inject air with water.

Q. Mr. Fitting, I may have missed part of your testimony, but for the sake of clarity, would you repeat the results of your survey of the decline of production?

A. Well the decline in production has been very variable in various leases that Cooperative owns in the field. Some are as high as 10 per cent per month. On a yearly basis that would be a little over 100 per cent, which is a little excessive

of the average decline of the two leases contained in this section. On the one on which we propose to make this injection, it is 3.2505, while the decline on the lease "G" is 4.15.

Q. This is in regard to the two leases on Section 31?

A. Yes, sir. The ultimate recovery shown by production of "A" lease is approximately 55,000 barrels; for the "G" lease approximately 52,000 barrels. As to the future, it is approximately 12,000 for "A" and approximately 15,000 for "G". Under primary recovery by the pressure decline for "A" lease is approximately 5,000 barrels; "G" lease, 3,000 barrels. It is difficult to know exactly which one to believe. If the pressure goes, probably one would obtain gravity drainage. How much you would get after the pressure becomes 50 pounds, I don't believe there will be an appreciable amount over and above the calculated volumes.

Q. Did you make a survey of decline in pressures and in production?

A. Our first survey made in june '47 showed an average pressure for the then 31 wells the Cooperative owned of 613 pounds. At that time there was 319,446 barrels produced out of the subject wells, and on March 16, 1950, out of an estimated decline for sixteen wells out of the total of 37 wells that the Cooperative Producing Association owned shows an average pressure of 104, a drop of 509 pounds, with a production of 647,554 barrels, or a drop of 2,071 barrels.

Q. Now, this decline, was that a decline of reservoir energy?

A. It is a decline of reservoir energy and it is apparent that it is still going down. But it is our opinion that when that pressure decreases another 50 pounds that production is going to be at a point where it will be non-economical as

far as the amount the wells in the field are producing.

Q. Now, what is your conclusion from this survey, that if they don't do something immediately they are going to lose all available reservoir energy and are not going to be able to control it with a secondary recovery program that we propose to install?

A. Yes, sir.

Q. Would you make any recommendation as to the type of recovery program?

A. Yes, sir, when it seemed that we would have to do something, we proposed to inject a volume of air not to exceed 200,000 cubic feet per day, that is the maximum volume, at a pressure not to exceed 200 pounds, and that the maximum volume of water to be injected at intervals would not be more than 5,000 barrels. The intention is to inject at a lower pressure and at constant volumes the use of water to prevent as much bypassing as possible , and the decrease in volume is to make the operation as slow as it can be made and still be practicable.

Q. Mr. Fitting, if this program should prove successful, can you tell the Commission what the benefit, if any, would be derived from it?

A. If we are able to get 20 per cent more in the way of recovery from the 13 wells on the subject Section 31, we would probably recover an additional 390,000 barrels. If that recovery goes as high as 40 per cent, we might get up to 485,000 barrels. The amount of money that it represents is somewhere around $73,000.00 to $111,000.00.

MR. McCORMICK: Are these per well figures?

COMMISSIONER SPURRIER: 13 wells?

A. The per well figure, I didn't figure; 246 roughly $800,000.00 altogether.

Q. Now, I just want it clear. I might have missed the testimony. What additional percentage average of recovery of oil and gas in place do you anticipate?

A. 20 per cent, I believe, is very reasonable. It might be higher. It is very possible that as additional energy is put on the reservoir, we might obtain as much as 50 per cent. In the volumetric analysis of oil in oil recovery the factor of 20 per cent is apparently 10 per cent higher than the normal production decline method of reserve analysis. There is a big gap in getting energy, picking up the additional 10 per cent not obtained by primary means. It might go as high as 50 per cent. Conservatively 20 per cent increase can be effected.

Q. Mr. Fitting, do you have an opinion or a conclusion as to whether your recommendation as to this secondary recovery program would promote conservation and prevent waste?

A. Definitely if it produces more oil it creates a situation in which it is not making any waste.

Q. Do you have an opinion as to whether this program is consistent with good oil field practice?

A. Yes, I think it would be.

MR. McCORMICK: What is the difference between "A" lease and "G" lease?

MR. BONDURANT: Actually I believe there is little or no basic difference, by a sale of the property of a former owner sold part of it to other people, which was ultimately bought by Cooperative.

MR. McCORMICK: Are there any overriding royalties on any part of this lease?

MR. BONDURANT: It is a 7.8 lease.

MR. MCCORMICK: Just you and the royalty owners concerned?

MR. BONDURANT: I believe it all the same lease, came through one assignment.

MR. McCORMICK: I thought there was one overriding royalty owner. This Cities Service Well located on the northwest of the northwest of Section 32, what condition is it now in as to producing oil?

A. I believe that that is a fair producer--five barrels.

MR. McCORMICK: Is it a pumper?

A. Yes, sir.

MR. McCORMICK: The Phillips well in west of the northwest, is that one that you operate?

A. Yes, sir, 10 barrels.

MR. McCORMICK: Is the Mid-Continent well, which is another one that you operate, about what kind it it?

A. Eight barrels.

MR. McCORMICK: What affect, if any, would this proposed plan have on those surrounding wells, the ones I asked about as well as the Vickers Estate well to the northeast?

A. You will notice on the contour map you have in your hand, that is a pressure map, that the pressure of well No. 7 is higher than the pressure of well No. 8 and 2. The effect of gravity drainage is toward the center. Cooperative Producing Association's A-2 as to the gravity drainage would be greater than the drainage from over to Cities Service. The injection of No. 2 well should improve the Cities Service well.

MR. McCORMICK: Could it harm that well?

A. It might be possible, however, we have closer wells than the Cities Service well. The effect of the injection would be felt by wells No. 8 or 7 before, and if it did seem to affect

it in a way that we didn't want to happen, we could stop the injection, which we propose to try. Whether or not it is going to work, we would like to try it.

COMMISSIONER SPURRIER: What does Cities Service think about it?

A. As far as I know they have no objection.

COMMISSIONER SPURRIER: Do you know, Mr. Denton?

MR. DENTON: No, I don't think they do. As far as the representative that comes to the field every week, they have no objection.

MR. McCORMICK: This probably isn't important--why is the compressor station located as far from the well as it is?

A. It is put in that location because if this air injection is successful, we would like to try it on other wells.

MR. McCORMICK: You have perhaps other injection wells on the same lease?

A. Yes, sir.

MR. McCORMICK: Has air injection been tried in west Texas or New Mexico?

A. Not so far as I know. I have looked up all references to it and have been unable to find any where in west Texas or New Mexico where it has been used.

MR. McCORMICK: Where has it been used?

A. In Pennsylvania and in Kansas. In the old Pittsburgh fields producing mainly from sand. This type has been tried and has been successful in most places. The addition of water is something that hasn't been tried too much. The evidence shows that it has been successful where it has been used. It is a superior method of injection over the control of the direction of where the air goes, and bypassing doesn't occur as rapidly.

MR. McCORMICK: What is the difference in principle between air and gas?

A. Air tends to corrode a little bit more. It sometimes creates an explosive mixture with gases. In this instance there doesn't seem to be that possibility. In the Caprock Field the gas is mainly nitrogen. It is well suited to injection of air--nitrogen, helium, not much methane. When methane is there, it is fairly rich.

MR. McCORMICK: It is calculated to obtain the same results as gas injection, along the same line?

A. Yes, sir, it is a little bit more difficult to inject. It does cost more money to inject air than it does to inject gas.

MR. McCORMICK: Now, do you know of any way that it would harm adjacent wells?

A. Yes, one way it could.

MR. McCORMICK: How?

A. That is the creation of gums within the reservoir. However, we sent to two different laboratories tests to see if the formation of gums would be a serious condition, and they say not especially with the addition of water.

MR. McCORMICK: Is there any other way that it could harm any adjacent well?

A. Not that I know of.

COMMISSIONER SPURRIER: Will this cause channeling. I realize with low pressures it will certainly control channeling.

A. It could very easily channel. We hope to control that by reducing pressures to prevent bypassing that would make channeling on Cooperative's leases. If it occurs seriously, we will stop the injection.

COMMISSIONER SPURRIER: It is not likely that with 200 pounds of pressure there would be much channeling when the original

reservoir pressure was eleven or twelve hundred, is that what you feel?

A. Yes, we do have a permeable member within the pay zone. In equiping the injection well we hope to pass the pay zone. We may find that air will go in the more permeable zone, and we might have to slug more water than anticipated at the present time. We don't know what we will run into, but from the practical standpoint, it looks like it is the only solution.

MR. McCORMICK: How thick is the pay horizon?

A. Gross about 25 feet. Net pay is 8 to 10 feet. Permeability varies from high to low. As an average it is about 231 millidarcys, average high permeability. Low is zero in shale which has a conate water percentage of about 2 per cent to as high as 31 per cent.

MR. McCORMICK: Are you satisfied that all of Caprock Pool is a common reservoir?

A. Yes, sir, it is considered a common reservoir. There are some streaks which are not present in all wells.

MR. McCORMICK: Some not connected with others over the unit?

A. You might have three separate sand lenses. All wells do not produce out of all three of them.

MR. McCORMICK: On Section 31 do all of these wells produce out of a connected horizon?

A. Apparently, there seems to be two sand lenses in A and G leases.

MR. McCORMICK: And is common throughut the section?

A. It is a little hard to gain definite information as to the thickness of of some of those pay horizons as these wells were purchased and the records kept were not too good.

MR. McCORMICK: Who owned them?

A. George B. Livermore.

COMMISSIONER SPURRIER: How far would you be to a source of gas?

A. I don't know.

MR. DENTON: The only gas would be over in the Amerada Field.

COMMISSIONER SPURRIER: Does anyone have any further questions of this witness?

MR. LOVERING: In indicating that 30 per cent increase in recovery of oil and gas, does that 30 per cent apply to gas?

A. The gas our recent survey shows that it is insufficient to measure out of the tubing of these wells.

MR. LOVERING: I can see 30 per cent in oil, but I can't see it in gas?

A. I am sorry if I said gas. There is not enough gas in there to worry about.

MR. LOVERING: O.K. You indicated that time was very important, and that loss of time might cause you to lose control of secondary recovery, what do you mean, cause you to lose?

A. We still have a small amount of solution. It would be easier to move this oil with a little gas in it than to move dead oil without the solution gas.

CHAIRMAN SPURRIER: Any one else have a question?

MR. McCORMICK: What is the production of this proposed injection well?

A. Two barrels a day.

MR. McCORMICK: How long will it take to get it into operation?

A. Well, 60 days if we are lucky to 90 days. We have several things to do. We have to clean it to the total depth, reshoot it again, to fix up some tubing. We have the compressor station to set. We do have the compressor and sufficient water.

MR. McCORMICK: Where would you get the water?

A. We drilled two wells to get it.

MR. LOVERING: Does it have any iron in it?

A. It is surface water.

MR. LOVERING: Surface water is more subject to bacteria activity which has a tendency to plug up the well.

A. We intend to treat it. We are not sure we will have to.

MR. McCORMICK: How long will it take after the injection for the pressure to start going up?

A. It will take six months before we begin to feel the effects of this if it does what we want it to. This is a slow proposition.

COMMISSIONER SPURRIER: Anyone any further questions? Is your case complete? If there are no further questions, the witness is excused, and the case is closed.

I might say something that I didn't say in the beginning of this hearing today. I have sat here in the capacity of examiner. All cases must be brought to the attention of the Commission before any orders can be issued. I might say also that I see no reason why I shouldn't recommend the granting of each case as it was presented.

The meeting is adjourned.

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STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I HEREBY CERTIFY THAT the foregoing transcript is a true and correct record of the proceedings had at the time and place first above written to the best of my knowledge, skill, and ability.

DATED this 13th day of June, 1950 at Albuquerque, New Mexico.

Margaret Parnell
REPORTER