BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 19, 1970

EXAMINER HEARING

IN THE MATTER OF:

Case No. 4172, being reopened pursuant to the provisions of Order No. R-3816, which order established 80-acre spacing units for the Northeast Lovington-Pennsylvanian Pool, Lea County, New Mexico.

Case No. 4172

(Reopened)

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. HATCH: In the matter of Case No. 4172, being reopened pursuant to the provisions of Order No. R-3816, which order established 90-acre spacing units for the Northeast Lovington-Pennsylvanian Pool, Lea County, New Mexico. All interested parties may appear and show cause why the said pool should not be developed on 40-acre spacing units.

MR. DURRETT: Mr. Examiner, please, J. M. Durrett, representing the Applicant. I have one witness, Mr. Sinclair.

B. C. SINCLAIR,

the witness, having been first duly sworn upon his oath, according to law testified as follows:

(Six exhibits marked 1 through 6, respectively.)

DIRECT EXAMINATION

BY MR. DURRETT:

Q Mr. Sinclair, will you please state your name and position for the record?

A B. C. Sinclair, Petroleum Engineer with Pennzoil United, Incorporated, Midland, Texas.

Q Have you previously testified as an expert witness before this Commission and had your qualifications made a matter of record?

A Yes.

MR. DURRETT: Is the witness' qualifications acceptable?

MR. NUTTER: Yes. They are.

Q Mr. Sinclair, in Case 4172, this case is reopened from

a previous hearing. Will you please tell us what Pennzoil is seeking at this time?

A We are seeking continuance of the 80-acre spacing which was approved on a temporary basis about a year ago for the Northeast Lovington-Pennsylvanian Field in Lea County, New Mexico.

Q Alright, Sir. Will you please refer to your Exhibit No. 1 which is a structure map and point out to the Commission what that shows?

A Exhibit No. 1 is a structure map contoured on top of the Strawn porosity which is a member of the Penn formation. This plat also shows the locations of the wells in the area that have penetrated the Penn formation. The contours are on a 100 foot contour interval and they generally show the structure dipping to the Northeast in the field area. A probable oil water contact is shown on the Northeast side of the field at a sub sea depth of approximately 7,675 feet.

Q Now, Mr. Sinclair, I believe this plat that you have here shows a Northeast Lovington-Penn field. Down to the South it shows the East Lovington-Penn Field. At the time of the first hearing were we under the impression that those two fields were really the same pool?

A Those two fields were classified as a common field at the time of the first hearing. However, as a result of that hearing and action after that they were reclassified into two

separate fields and the field that we are concerned with today is the northernmost field of the Northeast Lovington-Penn field. We are not concerned with the East Lovington-Penn Field.

Q That East Lovington-Penn Field is still on forty, is it not?

A Yes. It is still on forty acre spacing.

Q Let's move to your Exhibit No. 2. What is that exhibit?

A Exhibit No. 2 is an isopach map showing the net effective thickness of the Strawn formation. This map shows the productive limits of the reservoir and I might point out that as indicated by the dry hole shown, the reservoir is fairly well defined in all directions except maybe to the Northeast.

Q So you have pretty good control here on your structure or your pay except for up in the Northeast?

A Yes. That is correct.

Q Let's move now to your Exhibit No. 3 which is your well data and point out the pertinent information on that to the Examiner.

A This exhibit just shows all the wells that have been drilled in the Northeast Lovington-Penn Field and gives individual data for each of these wells. The dry hole as well as the completed wells are shown. The information shown is the location, the completion date, the perforations, the initial treatment and

the initial potential of the wells. Their current production both oil and water is shown. The method of production is shown where they were flowing or pumping and the cumulative production as of June 1st, 1970 is shown for each well.

I might point out in connection with this exhibit that the ultimate recoveries of oil for the wells in this field will vary greatly. One well, the Getty Oil Company Montieth "A" No. 1 has already produced 904 barrels of oil while the Clinton Oil Company Montieth "C" No. 1 well has produced 2,262 barrels of oil and is already approaching the economic limit, so the recovery will vary greatly for these wells.

Q Let's move now to your Exhibit No. 4 which is your reservoir and fluid properties.

A Yes, Sir. This exhibit shows the average reservoir fluid properties for the reservoir. Those that are pertinent to our spacing hearing would be the porosity 8.5%. The permeability which varies somewhat throughout the vertical zone from 1 to 100 millidarcies. The original bottom hole pressure, 4,000 pounds. The oil gravity is quite high -- 44 degrees API. The reservoir energy is solution gas drive. We do have an oil water contact indicated but there is no evidence so far that we are getting any pressure support from water encroachment. The extent of the reservoir as is planimetered from the isopach map, 1,320 acres and I'd like to say that these properties are

favorable to draining areas in excess of forty acres. This exhibit also shows some reservoir calculations that I have made. The reservoir volume as planimetered from the isopach map is 29,821 acre feet and the estimated ultimate recovery of oil is 2,637,800 barrels. That is estimated from the decline curves. It also shows the original oil in place which is a volumetric calculation based on the reservoir volume determined from the isopach map and this is 9,493,400 barrels. The recovery factor which is determined by dividing the recoverable oil by the oil in place is 27.8% and the average drainage area for each well determined by dividing the areal extent of the reservoir by the number of producing wells was 132 acres per well.

I think it is evident that the current spacing is doing a good job of efficiently draining the reservoir. The 27.8% recovery factor is considerably higher than what is recognized as being normal recovery for a solution gas drive reservoir which is in the range of 17 to 20 percent. I think that we are doing an efficient job of draining the reservoir on the current spacing.

Q Now, am I correct that your figures here on Exhibit No. 4 show that you have more oil in place than we thought originally at the hearing -- at the first hearing?

A I am not sure about that, Mr. Durrett. I am not sure. The thing that they do show, which is a result of a separation

of the two fields, is that the average recovery per well would be considerably higher for the Northeast Lovington Field as the exhibit currently exists than it would have been for the field if they were combined.

Q So with the experience that we have it looks like we are getting better recovery?

A Yes.

Q Alright. Let's go to Exhibit No. 5 now which is your bottom hole data.

A Yes. This is very similar to the exhibit we presented earlier which presents bottom hole pressure data which in my opinion very closely approximates the information that you would obtain from an interferrance type test. The first two wells shown, the bottom hole pressures are the original bottom hole pressures for two of the wells in the field. These were the Getty Montieth "A" No. 1 and the Getty Montieth "B" No. 1 wells and their original pressures were 3,990 and 3,785, respectively, and these pressures were taken in August of 1952 in one case and March of 1953 in the other case, so they do represent very close to the original bottom hole pressure for the reservoir which we estimate was around 4,000 pounds.

The next four wells shown are also original bottom hole pressures for these wells. They were all drilled later in the life of the reservoir and in each case they show bottom hole pressures considerably less than the 4,000 pounds original

for the first two wells.

I have shown the distance from each of these wells to the nearest prior producer to indicate that the wells that existed before they were drilled were draining areas and draining all over distances considerably greater than the normal distance between wells drilled on eighty acre spacing. One well, the Pennzoil State "C" No. 1 had bottom hole pressure of 3,026 pounds initially. That was in January of 1969 and this is almost a thousand pounds below the original reservoir pressure and this well was 5,600 feet from the nearest producing well in the reservoir at that time indicating the oil had been drained in distance in excess of over 5,600 feet.

Finally, the last three wells shown there, these are recent bottom hole pressures taken on three Pennzoil wells in the field and, as you will note, the pressures are in very close agreement with 2,648, 2,569 and 2,600 pounds and the close agreement of these pressures indicates the reservoir is being efficiently and uniformly drained.

Q Now, those last three wells which you are talking about there, your Pennzoil wells, are up in the Northeast corner of the pool, is that correct?

A Yes. These wells are located in close proximity to one another. They are up in the Northeast -- on the Northeast side of the field and in a little cluster up there shown on the isopach map.

Q Let's move now to your next exhibit -- that would be Exhibit No. 6. Would you briefly summarize that for the Commission?

A Yes. The economics here are shown for forty acre and eighty acre spacing and a comparison is presented. Overall the economics are presented -- that I present today are better than the economics presented a year ago, primarily due to the separation of the two areas and the average recovery per well being better for the field as it currently exists.

We show estimated recovery for two wells on forty acre spacing of 303,000 barrels of oil and for eighty acre spacing, one well on eighty acre spacing, 264,000 barrels of oil. This results in gross revenue of a 1,290,000 dollars for forty acre spacing and 873,800 dollars for eighty acre spacing. After deducting royalty and severance tax leaves them total revenue of net revenue of 824,800 dollars as compared to 718,700 dollars. Then deducting expenses, the expense to drill, complete and equip the wells is shown to be 480,000 dollars for two wells on forty acre spacing versus 240,000 dollars for one well on eighty acre spacing.

The operating costs are shown to be 112,000 dollars for forty acre and 77,000 dollars on eighty acre spacing. That leaves a net profit of 232,800 dollars for two wells on forty acre spacing or 401,700 dollars for one well drilled on eighty acre spacing.

The profit investment ratio is shown to be .49 for forty acre and 1.67 for eighty acre spacing.

I might say that it is generally accepted that profit investment ratio of around 1.0 is what you need to justify investment of this type.

Q Now, your economics that you show here -- I believe you have a note on here, "this analysis does not consider the ten dry holes that have been drilled."

A That is correct. You have to recover enough profit from the ten producing wells to also pay out the ten dry holes before you would be in a profit situation for the field as a total.

Q Mr. Sinclair, in your opinion as a Pennzoil engineer, has the Northeast Lovington-Penn Pool been efficiently and economically drained and developed on eighty acre and will it continue to be so in the future.

A Yes.

Q You base that opinion upon the information that you have presented to the Commission here today?

A Yes. That is correct.

Q Am I correct that the other two operators in this field are Getty Oil Company and Clinton Oil Company?

A Yes. That is correct.

Q Have you contacted them concerning this hearing today?

A Yes. I have and they both stated that they would send telegrams or letters supporting our request for continuance of eighty acre spacing.

Q Were Exhibits 1 through 6 prepared by you or under your supervision?

A Yes. They were.

MR. DURRETT: Commissioner, please, I move the introduction of Exhibits 1 through 6 and that will conclude my direct examination.

MR. NUTTER: 1 through 6 will be admitted in evidence.

Are there any questions of Mr. Sinclair?

CROSS- EXAMINATION

BY MR. NUTTER:

Q Mr. Sinclair, a year ago when we had this case up for hearing the Northeast Lovington and the East Lovington were all considered one pool, is that correct?

A Yes, Sir. That is correct.

Q And then the equivalent to your Exhibit No. 6 at that hearing showed less recovery per well?

A Yes, Sir.

Q And that was because you were including the wells down here in the East Lovington Pool in the computations at that time?

A Yes, Sir. That is correct. We were including them

and also I think the performance we have seen during the past year justifies increasing the estimated recovery from the wells in the northern area now too.

Q By including the wells in the southern portion you brought down the average recovery per well?

A Yes, Sir.

Q So by eliminating them this year you have got better recovery?

A Yes. That is true.

Q Now, your recovery is taken from Exhibit No. 4 in which you estimated total estimated recovery of 2,600,000 for the ten wells in the north would be based on decline curves only. Did you make any volumetric computation of the oil in place?

A Yes, Sir. I did and these estimates are also supported by volumetric calculations.

Q Using a recovery factor similar to what you have used here or what?

A Yes. Let me see what recovery factor I did use. I have some information on that right here handy.

Yes. I used recovery factors in my volumetric estimates of 20% and the recovery, for instance, for one well here, the Pennzoil "C" No. 2, was 211,000 barrels of oil based on volumetrics on a 20% recovery factor.

Q Actually the 27.8 that you indicated on Exhibit No.

4 frequently would be a little high for solution gas drive reservoirs, I believe?

A Yes, Sir. It would. This is an unusually good reservoir and I think it also indicates we are doing an efficient job of draining.

Q No evidence of no other kind of drive except this solution gas drive?

A No, Sir. We have no evidence of pressure support or pressure maintenance. We do see a little water production in the wells on the northeast side of the field -- nothing serious yet, but we anticipate that those wells will make more water as time goes on.

Q You think that the oil water contact will move southwest?

A Yes. It will move, but we don't think it will support the pressures.

MR. NUTTER: Any further questions of Mr. Sinclair?

You may be excused.

You have anything further, Mr. Durrett?

MR. DURRETT: Nothing further, Mr. Examiner.

MR. NUTTER: Does anyone have anything to offer in this case?

MR. HATCH: The Commission has received a letter from Getty and a telegram from Clinton Oil Company supporting the applicant.

MR. NUTTER: Thank you. There being nothing further in this case, we will take the case under advisement and call Case No. 4399.

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

I, Peter A. Lumia, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Peter A. Lumia

Peter A. Lumia, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4172, heard by me on 8/19, 1970.

, Examiner
New Mexico Oil Conservation Commission

I N D E X

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 6, 1969

EXAMINER HEARING

IN THE MATTER OF:	
Application of Pennzoil United, Inc., for special pool rules, Lea County, New Mexico.	Case No. 4172

BEFORE: Daniel S. Nutter.

TRANSCRIPT OF HEARING

I N D E X

E X H I B I T S

	Marked	Offered and Admitted
Applicant's Exhibits Nos. 1 through 8	4	15

MR. NUTTER: The Hearing will come to order, please. We will call Case No. 4172.

MR. HATCH: Case No. 4172, continued from the July 23, 1969, Examiner Hearing. Application of Pennzoil United, Incorporated for special pool rules, Lea County, New Mexico.

MR. DURRETT: If the Examiner please, J. M. Durrett, appearing for the Applicant. I have one witness, Mr. Sinclair.

B. C. SINCLAIR

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

DIRECT EXAMINATION

BY MR. DURRETT:

Q Mr. Sinclair, will you please state your name and position for the record?

A My name is B. C. Sinclair, Petroleum Engineer, Pennzoil United, Incorporated, Midland, Texas.

Q Have you previously testified as an expert witness before this Commission?

A Yes, I have.

MR. DURRETT: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

(Discussion held off the record.)

BY MR. DURRETT:

Q Mr. Sinclair, would you briefly state what Pennzoil is seeking by their Application in Case No. 4172?

A We are seeking promulgation of field rules for the Lovington East-Penn Field which established 80-acre spacing and proration units for the field with well locations within 150 feet of the center of Governmental quarter quarter section.

(Whereupon, Applicant's Exhibits Nos.1 through 8 were marked for identification.)

BY MR. DURRETT:

Q All right. Let's refer to your Exhibit No. 1. Is that a plat of this area?

A Yes, sir, it is.

Q What does that show?

A Exhibit 1 is a structure map with the contours drawn on top of the Strawn porosity. Strawn is a member of the Pennsylvanian formation. The map also shows the location of all wells which have penetrated the Penn Reservoir in this field and immediate area.

I would like to point out also in connection

with this Exhibit that the discovery well for the field was the Getty State P No. 1 located in Section 32 which is near the center bottom of your map.

I would also like to cover some of the history of the field. The field was discovered in April of 1951 and development of the field has taken place in two stages. The first stage of development which ended in October of '54 resulted in the drilling of 7 producing wells and 8 dry holes. The second stage of development which began in August of 1967 and has continued to the present resulted in the drilling of 8 producing wells and 4 dry holes. Now, development of the Reservoir is still under way at the present time with Pennzoil at the present time drilling in State 21, No. 1 in Section 21 which is near the northeast edge of the field.

Q Let me just interrupt you for a moment here, Mr. Sinclair. The initial development back in the early '50's down here in Sections 31, 32, 33 and 4, 5 and 6, I presume?

A Yes, sir, that's correct.

Q And all of the production is in 7 producing wells. That would be the 5 wells or the 4 wells in the lower tier of the Sections, the well in Section 31, the

one in 32, and the one in 33?

A Right. No --

Q (Interrupting) That was the original pool --

A (Continuing) No, sir, that is not quite right. The original 7 producers were the wells in Sections 4 and 5, the well in Section 32, the well in Section 31, and then the Getty-Montieth No. 1-A up in Section 20 and the Getty-Montieth -- a later exhibit will give you completion dates on these wells -- but the 7th well completed in the early stage of development was the Getty-Montieth "B" No. 1 in Section 19. So the south area was developed in the early stage and the north area was partially developed in the early stage of development.

Q There was a little bit of production up in the north end earlier?

A Yes, that's right. I will get into a little more detail on that in just a minute.

Q All right. I was probably just rushing things.

A There was one dry hole drilled in between these two stages of development. The total number of wells drilled to date is 15 producers and 11 dry holes.

I might point out that the wells along the extreme west side of the map all the way from the north end of

the map to the south end are not included in these totals. They are part of the Lovington field which I am not considering.

Q How many wells are Pennzoil operating in this --

A (Interrupting) We operate 4 producing wells and we drilled two dry holes -- one dry hole in the area.

Q Let's go to your Exhibit No. 2, Mr. Sinclair. What is that?

A This is another map which shows the location of the wells and shows the approximate productive limits of the Reservoir. It also shows the net pay thickness of each of the producing wells that have produced from the Reservoir. The net pay, for purposes of this map, was taken to be all pay that had a porosity of 5 percent or greater and that was above the oil-water contact. I might refer you back to Exhibit 1 to point out that we do show an oil-water contact at the amount of 7576 feet Sub-C.

Q That number again, sir?

A 7576 Sub-C depth. These two areas of development as we discussed earlier, the south area was developed during the early stage of development and the north area was partially developed and it has been more completely

developed in the last 3 years. There are several dry holes between the two areas that separate the areas and we believe that they are two separate producing reservoirs.

Q Is that all you have for that exhibit?

A That's all.

Q Let's move to the next exhibit which is No. 3. That is your well data. Would you point out the pertinent things that that shows?

A Yes. This is a list, by operators, of all wells that have been drilled to the Penn Pay in the field. The information shown there is the location of the well, its completion date, the perforation, the initial treatment, the initial potential test, the current daily production of each well that is still producing, the method of production and cumulative oil production to July 1st, 1969.

Other than this statistical data, I would like to point out that the wells completed in this Reservoir will have a very wide range of primary recovery. For example, I call your attention to the Skelly State "O" No. 13 on the first page of the exhibit which recovered 17,040 barrels of oil before it was depleted and re-completed to the Paddock formation.

A similar well was the Getty State "U" No. 1

which recovered 19,647 barrels of oil before it was depleted and re-completed to the Paddock.

In contrast to this, look at the Getty-Montieth "A" No. 1 which has recovered 888,000 barrels -- 649,000 barrels of oil -- to 7/1/69 and is estimated to ultimately recover in excess of a million barrels of oil.

Q What does that indicate to you, if anything?

A It indicates that the reservoir is not a completely homogeneous reservoir, that there is some erratic development of the reservoir resulting in these large range of recoveries.

Q Moving now to your Exhibit No. 4, what is that exhibit?

A This is a plot of monthly oil production, the monthly gas-oil ratio and the number of producing wells in the East Lovington-Penn Field.

I would like to point out that the initial development resulted in a peak production back in the latter part of 1952 of 25,000 barrels of oil per month and 7 producing wells. From that time until the early part of 1967, the reservoir -- the wells in the reservoir -- experienced what we consider a normal decline. Then the second stage of development which began in 1967 resulted

the production increase as shown there which reached a peak of 30,000 barrels of oil per month in June of 1969. This was from 9 producing wells.

Q Let's move now to your Reservoir and Fluid Properties. That is No. 5. Would you point out the pertinent data on that?

A Yes, this is an exhibit representing the average reservoir and fluid properties for the East Lovington-Penn Reservoir and the pertinent things here are the porosity, 8.5 percent; the bottom-hole temperature, 155°F; the oil gravity, 44 degrees A.P.I.; the formation volume factor, 1.45 reservoir barrels per stock tank barrel; reservoir energy which appears to be strictly solution gas drive.

The significance of these fluid and rock properties is that they are in the range of properties that are condusive to movement, easy movement of fluid through the reservoir which is necessary for recovery -- for drainage by one well of large areas. The primary property that is affected by these properties is the oil viscosity which we feel would be very favorable for drainage of large areas.

Q These are average figures that you have here?

A Average figures for all of the wells that have produced.

Q Now, refer to the Log, if you would, which is Exhibit No. 6?

A We intend to show this as an example Log for the field. It is a gamma ray neutron log of Pennzoil State "C" No. 1 well. It shows the perforations in the Penn Pay which are from 11,403 to 11,484 feet. It also shows the tops of the various geological markers such as the Wolfcamp correlation point near the top of the log, the top of the Strawn formation and the top of the Atoka formation as shown on the log.

Q Let's go to No. 7 now, which is the bottom-hole pressure data.

A This Exhibit shows the original bottom-hole pressures that were recorded in several specific wells in the field. The first two shown are the Getty-Montieth "A" No. 1 and Getty-Montieth "B" No. 1. Both of these wells were drilled early in the life of the field and they recorded pressures of 3990 pounds in the case of the Montieth "A" and that was in August of 1952. The pressure in the Montieth "B" was 3785 pounds recorded in March of 1953. This data, these two pressures established

the original reservoir pressure at approximately 4000 pounds per square inch at a Sub-C depth of minus 7600 feet.

Q Mr. Sinclair, would you for the purposes of clarification refer back to your Exhibit No. 2 and tell us where those wells are located that you are speaking of?

A Right. The Montieth "A" is in the southwest corner of Section 20. The Getty-Montieth "B" No. 1 is in the northwest quarter of Section 19.

Q Okay.

A The next four wells shown were all drilled during the latter stage of development. Each well encountered bottom-hole pressure, original bottom-hole pressure before any production was taken from that well which was well below the original reservoir of 4000 pounds. For example, I would like to call your attention to the Pennzoil State "C" No. 1 which encountered an original pressure of 3026 pounds in January of 1969. This well is located in the northeast corner of Section 20. This well is 5600 feet from the Getty-Montieth "A" No. 1 in the SW/4 of Section 20 and this Getty-Montieth "A" No. 1 was the nearest prior producer to the State "C" No. 1 at the time the State "C" No. 1 was completed.

Q That is the well that has made almost a million

barrels?

A Yes, sir. This illustrates that the fluid had moved out of the State "C" No. 1 area caused by the drainage, by the Montieth "A" No. 1 well. It illustrates that fluid has moved well in excess of the 1870 feet which is the normal distance between wells for 80-acre spacing. This is not a bottom-hole interference test as such, but it accomplishes, we feel, the same purpose as interference tests conducted strictly to show interference.

Q So it is your opinion that this does show drainage between the wells or interference?

A Between two wells located 5600 feet apart.

Q Right. Let's move to your next exhibit which is No. 8.

A This exhibit presents comparative economics for a typical well drilled in the field for 80-acre versus 40-acre spacing. The estimated recovery for a well drilled on 80-acre spacing is shown to be 217,000 barrels of oil near the top of the Exhibit. This estimated recovery for an average well is the average of the estimated ultimate recovery for all of the 15 producing wells that have been drilled to date. In arriving at the estimated ultimate recovery, decline curves

were used, both bottom-hole pressure versus cumulative oil production and monthly oil production versus time in estimating cumulative production from these wells. The newer wells which do not have enough production history, the estimate was made by volumetrical calculations. The total revenue -- let me back up just a minute -- a slightly increased recovery for 40-acre spacing, this is a result from our thinking that two wells on an 80-acre tract will more efficiently drain the tract and we will see about a 15 percent increase in recovery from two wells on an 80-acre tract as opposed to one.

Total revenue show after royalty and severance tax is $649,700 in the case of 40-acre spacing and $564,000 in the case of 80-acre spacing. The estimated cost to drill, complete and equip a well in this reservoir is $240,000. Two wells will be required for development on 40-acre spacing. The operating costs shown are $112,000. for 40-acre spacing and $77,000. for 80-acre spacing. Eleven year life under 80-acre spacing is estimated and an annual operating cost of $7000. per well per year. This makes a total expense of $592,000. for 40-acre spacing and $317,000. for 80-acre spacing and leaves a net profit of $57,700. under 40-acre spacing and $247,000.

under 80-acre spacing. The profit to investment ratio is shown to be .12 for 40-acre and 1.03 in 80-acre spacing.

I might point out that a profit to investment ratio of .12 is not considered adequate to justify the investment of $480,000. in the wells that would be required to develope this reservoir. I would also like to point out that in this economic consideration or this economic analysis, that dry holes have not been considered. No provision has been made to recoup this money spent on dry holes.

Q Mr. Sinclair, were Exhibits 1 through 8 prepared by you or under your supervision?

A Yes, they were.

MR. DURRETT: If the Examiner please, I move the introduction of Exhibits 1 through 8.

MR. NUTTER: Applicant's Exhibits Nos. 1 through 8 will be admitted in evidence.

(Whereupon, Applicant's Exhibits Nos. 1 through 8 were offered and admitted in evidence.)

BY MR. DURRETT:

Q Mr. Sinclair, in your opinion as a petroleum engineer, can the East Lovington-Pennsylvanian oil pool be efficiently and economically drained and developed

on 80-acre spacing?

A Yes, sir, it can.

Q Do you feel that well locations within 150 feet of the center of a Governmental quarter quarter section will adequately protect correlative rights?

A Yes, I do.

MR. DURRETT: Mr. Examiner, we have communications from Mr. H. Lee Harvard who is the Expiration Manager for the Southwest Production Corporation and from Mr. J. E. Pierce of Getty Oil Company. I believe the Commission has those. If not, I have a copy and I would like to present it to the Commission at this time.

MR. NUTTER: I don't see them in the case file.

MR. DURRETT: Let me just give you a copy of these. We would like to have these made a part of the record, if you would.

MR. NUTTER: We have a letter from Southwest Production Corporation and we have received the letter from Mr. Pierce from Getty Oil Company, so if you want your copies back, you can have them.

MR. HATCH: Let me also point out that the Commission has also received a communication from the Southern Petroleum Exploration Company.

MR. NUTTER: Thank you, Mr. Hatch.

MR. DURRETT: I believe that all of these communications support the Application, Mr. Examiner.

That will conclude our direct examination.

MR. NUTTER: Southwest says they support it. Getty says they are in favor of it. The telegram says they support Pennzoil. That telegram, as Mr. Hatch mentioned, is from Southern Petroleum Exploration.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Sinclair, turning first to your Exhibit No. 3 there, I think, under Pennzoil United?

A Yes, sir.

Q We have your Aztec State No. 1 and Aztec "C" State No. 1 and that other one is State "C" No. 2, I presume, isn't it?

A Yes, it is.

Q Now, what are the present pool limits as defined by the Commission, Mr. Sinclair, do you know?

A I have copies of all of the orders that have extended the field from its original boundaries.

Q Could you describe what the boundary of the pool is?

A It would take some --

Q (Interrupting) It appears that we have two pools and I think that you, in fact, stated that you thought these two areas were separate and distinct reservoirs?

(Discussion held off the record.)

BY MR. NUTTER:

Q At any rate, what I do want to establish for sure is that we have defined this southern area down here as being in the East Lovington Pool?

A Yes, sir.

Q And we also have these producing wells up here in Section 19 and 20 as being in the pool, is that correct?

A Yes, sir, that's correct.

Q And there is an interval there of more than a mile separating the two producing areas and it does contain several dry holes?

A That's right.

Q Do you think it would be proper for the Commission to separate these pools and make a northern pool and a southern pool?

A As far as I know, there would be no detrimental effect to anyone there, Mr. Nutter. There is only one producing well in the southern area at this time.

Q And all of the pressure data that you offered

on Exhibit No. 7 relates to wells that are in Sections 18, 19 or 20 which would be in the northern area?

A Yes, sir.

Q So if the Commission were to separate the two areas into two pools, the data here doesn't offer any testimony. You don't offer any data as to drainage in the south or pressure declines or anything and the case would be limited to consideration of spacing for the northern area?

A That would be perfectly all right with Pennzoil.

Q That's where all the activity is right now?

A Right.

Q How many of these wells in the north are still producing or are they all still producing?

A All the wells that ever produced in the north area are still producing.

Q Now, all of the wells are located in such a manner that 80-acres could be dedicated to them, are they not?

A Yes, sir, they are.

Q Do the operators have 80 acres in the instance of each well or would it be necessary to communitize? We don't have ownership shown here.

A I can't answer that question for sure. I know that in the Pennzoil case we have 80 acres in each case. I believe that the other operators do too, but I cannot speak for sure about them. There are only two other operators, the Getty and Southwest.

Q Now, prior to the new development which started in 1967, how many wells were in the north? The Getty-Montieth 1-A was an old well --

A (Interrupting) Yes, sir, and the Getty Montieth B-1 or the 1-B was an old well in Section 19, the NW/4. All of the other wells, producing wells up in that area have been drilled since August of 1967.

MR. DURRETT: Mr. Examiner, I might just state at this time that Mr. Harvard is here from Southwest Production Corporation and he has just informed me that they do have 80 acres available to dedicate to their wells.

MR. NUTTER: I see.

(Discussion held off the record.)

BY MR. NUTTER:

Q Mr. Sinclair, did you make any type of a volumetrical calculation regarding this Getty-Montieth 1-A to see -- I think you show 35 feet of net pay here in

that well -- to see what volume of acreage or what area with this amount of pay would be necessary at the average rate of porosity of 8½ percent in order to produce almost a million barrels?

A No, sir, I did not. I could do that and furnish that information to you, if you like, sir.

Q Using the figures that are on your Exhibit No. 5 with the volume factors and so forth, what is the amount of recoverable oil under a 40 or under an 80 based on the volumetric calculations in these figures?

A I believe I can tell you in just a minute. Did you say under 40 acres?

Q 40 or 80, either one.

A Under 80 acres, using 35 feet of pay and 8.1 percent porosity --

Q (Interrupting) 35 feet of pay?

A Yes, sir, 35 feet of pay and 8.1 percent porosity and a 30 percent conic water saturation, the formation volume factor of 1.50, an 80-acre tract would recover 148,000 barrels of oil.

Q What recovery factor are you using?

A That is an 18 percent recovery factor. I think all of those were fairly close to the average properties

I presented except maybe the --

Q (Interrupting) Well, you have 8½ percent average porosity and 36 feet of average pay?

A Right.

Q And your volume factor changed from 1.45 to 1.50?

A These were the numbers I used on one well.

Q Apparently, even though you've got 30 percent conic water here, it is not being produced?

A No, sir. We are not recovering any water.

Q Relative pressure to the oil is such that the water is staying in there?

A Yes, sir, that is correct. I believe one well, the last well completed by Southwest Production Corporation made some water on the potential test. The well is in the process of being equipped for pumping now and we have not had any sustained production so we don't know what the water production might do on that well.

Q Here on your Exhibit No. 3, Mr. Sinclair, I notice that the highest well in the pool as far as perforated intervals is concerned, would be this Skelly State "O" No. 13 down in Section 31, but referring to the wells that are in the south -- no, that's in the south

end too. Let's see, in the north end, the highest well would probably be Southwest-Montieth State "A" No. 1. No, it would be the B-1. No, it will be the C-1 at 11,095 to 128.

A Are you talking about highest perforations?

Q Yes, perforated intervals?

A Yes.

Q Then the lowest would be your State 16, No. 1 whose perforated interval is 11,452 to 471. Now, are these zones correlative across the pool?

A Yes, they are. If you will look at Exhibit 1, the Sub-C depth at a correlative point in the Southwest-Montieth No. 1 "C" which you designated as the highest well is --

Q (Interrupting) That is the far western well there in Section 24, correct?

A Yes. Minus 7230.

Q Okay.

A And the Sub-C depth of the same correlative point in Pennzoil State 16, No.1 up on the northeast side is the amount of 7592. We do have a good bit of dip in the northeast direction there.

Q But when you take a cross section across the

pool, these zones are correlative across the Section?

A Yes, sir.

Q Just dipping to the northeast?

A That's correct.

Q How has this water-oil contact at minus 7675 been established?

A This was from the three wells of Pennzoil around the section corner of Section 20. Each of these wells encountered from log calculations an increased water saturation at the bottom of the pay.

Q They were drilled considerably deeper than the perforated intervals in each case?

A Yes, sir, they were drilled well below the perforated interval in each case.

Q Drilled to 11,600-something and the perforated interval is 11,300 to 11,400?

A Yes, sir, that is correct.

MR. NUTTER: Are there any further questions of Mr. Sinclair?

You may be excused.

(Witness excused.)

MR. NUTTER: Have you already offered your exhibits, Mr. Durrett?

MR. DURRETT: I believe I did.

MR. NUTTER: Do you have anything further, Mr. Durrett?

MR. DURRETT: No, sir, that's all.

MR. NUTTER: Does anyone have anything they wish to offer in Case No. 4172?

We will take the case under advisement.

STATE OF NEW MEXICO)
) SS.
COUNTY OF SANTA FE)

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

COURT REPORTER

My Commission expires April 8, 1971.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4172, heard by me on 8/6, 1969.

, Examiner
New Mexico Oil Conservation Commission

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 23, 1969

EXAMINER HEARING

IN THE MATTER OF:

Application of Pennzoil United, Incorporated for special pool rules, Lea County, New Mexico.

Case No. 4172

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. HATCH: I have one continuance. Where do you get the other one?

MR. UTZ: I picked one up on you, George. 4172.

MR. HATCH: Case 4172. Application of Pennzoil United, Incorporated for special pool rules, Lea County, New Mexico. The Applicant requested this case be continued to August 6, 1968.

MR. UTZ: Case 4172 will be continued to August 6th Examiner Hearing.

STATE OF NEW MEXICO)
) SS.
COUNTY OF SANTA FE)

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Richard L. Nye
COURT REPORTER

My Commission expires April 8, 1971.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4172, heard by me on July 25, 1969.

Examiner
New Mexico Oil Conservation Commission