

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

1958 JUN 12 AM 3 23

IN THE MATTER OF:

CASE NO. 1442

TRANSCRIPT OF PROCEEDINGS

May 14, 1958

BEFORE THE
OIL CONSERVATION COMMISSION
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IN THE MATTER OF: :
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Application of Pure Oil Company for the :
extension of the South Vacuum (Devonian) :
Pool and for the promulgation of special :
rules and regulations for said pool. Ap- :
plicant, in the above-styled cause, seeks :
an order extending the horizontal limits :
of the South Vacuum (Devonian) Pool to :
include certain acreage in Township 18 :
South, Ranges 35 and 36 East; Township :
19 South, Ranges 35 and 36 East, in Lea :
County, New Mexico. The applicant further :
proposes that special rules and regula- :
tions for the South Vacuum (Devonian) :
Pool be promulgated incorporating, among :
other provisions, the establishment of :
80-acre proration units in the South :
Vacuum (Devonian) Pool. :
:
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CASE NO.
1442

BEFORE:

A. L. Porter
Murray Morgan

TRANSCRIPT OF PROCEEDINGS

MR. PORTER: The meeting will come to order, please, and
we will take up Case No. 1442.

MR. PAYNE: Case 1442. Application of Pure Oil Company
for the extension of the South Vacuum (Devonian) Pool and for the
promulgation of special rules and regulations for said pool.

MR. PORTER: Let me ask just informally, how many intend
to present testimony?

MR. DUREE: I shall, and I have a geologist, in the event we need him.

MR. PORTER: You are representing Pure Oil Company?

MR. DUREE: Yes, sir.

(Witness sworn.)

MR. DUREE: Mr. Examiner, my name is Jack Duree, D-u-r-e-e. I am chief production engineer for the Pure Oil Company located at Fort Worth, Texas. I have appeared previously before this Commission, however, not in the recent years, and if you desire, I will be happy to reveal my qualifications.

MR. PORTER: Just briefly, please, sir.

MR. DUREE: All right. I was graduated from Texas A & M College in 1942 with degrees in petroleum engineering and mechanical engineering. I have spent five and a half years in the employ of the Magnolia Petroleum Company; three years as a mechanical design engineer and the remaining as a petroleum engineer. Since that time I have been employed by the Pure Oil Company in the capacity of production engineer and chief division production engineer.

MR. PORTER: Your qualifications are acceptable.

MR. COOLEY: Q Mr. Duree, is the South Vacuum Pool under your present jurisdiction with the Pure Oil Company?

MR. DUREE: A Yes, sir.

Q And you have made special studies with regard to that pool?

A Yes, sir.

Q Proceed.

A The South Vacuum Pool was discovered in the South Vacuum Unit Well No. 1-35. We have a map which will show its location. Incidentally, Mr. Chairman, I have not marked these exhibits, one or two. If you desire, we will be happy to put them up on the bulletin board.

MR. PORTER: Would you like to have this first map designated as Pure's Exhibit No. 1?

A If you would be so kind. The well is shown in red on the map. It is approximately in the south center portion of the area covered by the map. This well was drilled by Union Oil Company of California, and was completed in the Devonian horizon, and perforations from 11643 to 11680. The well initially produced 316 barrels of oil during a five hour period on a half inch choke. The Pure Oil Company was designated as unit operator upon the completion of this well, and is currently drilling the South Vacuum Unit Well No. 2-35. That well is located diagonally to the southeast of the first well.

The Pure Oil Company, under date of March 19, 1958, requested the holding of a hearing to consider adoption of field rules for development of the South Vacuum Devonian Pool. The request included extension of the pool limits to the area outlined on the map, marked as Exhibit 1, in red. We would like to, at this point, revise that area that we think should be included to that outlined in green on the map. If you would like, I will read into the record the

designation of that area as to sections and the like.

The revised area is comprised of the Southeast Quarter of Section 21. These will all be in Township 18 South, Range 35 East, that's the Southeast Quarter of Section 21; all of Section 22, with the exception of the North Half of the Northwest Quarter; the Southwest Quarter West Half, and Northwest Quarter, and the West Half of the Southwest Quarter of Section 23. The West Half of the Northwest Quarter, the West Half of the Southeast Quarter, and the Southwest Quarter of Section 25; Sections 26; Section 27, the East Half of Section 28, the Northeast Quarter of Section 33; Section 34; Section 36. All of these are in Township 18 South, 35 East. In Township 19 South, Range 35 East, Sections 1 and 2, and the Northeast Quarter of Section 3.

MR. NUTTER: Would you read into the record the description of the area in Section 23 again.

A Section 23. The Southwest Quarter, the West Half of the Northwest Quarter, the West Half of the Southeast Quarter.

MR. NUTTER: Is Section 35 included in the area?

A Yes. Did I omit that?

MR. NUTTER: I believe you did.

A It is unintentionally. I intended to include it. The area outlined in yellow is the limits of the South Vacuum unit. This map is also prepared to show our interpretation of the Devonian structure. It was prepared by the Pure Oil Company's Development Geological Section. It is, of course, based on very few surface

control points and will be subject to change as additional information is obtained. It is our best interpretation at this date. We have one of our development geologist here who can testify on any questions you may have relative to the structural interpretation. Generally, it is a northwest-southeast trending anticline. We've also prepared a tabulation of various well and reservoir data that we have collected on the South Vacuum unit Well No. 1-35. I believe I have sufficient copies to distribute, and we would like to present that in evidence as Exhibit 2.

Briefly, to read these into the record, the physical properties of the reservoir rock is determined from this well. The average porosity is 6.5 per cent. The average permeability, 226 millidarcys. The average interstitial water saturation is 32.5 per cent. Net pay thickness, 105 feet, which represents 40 per cent of the cored interval analysed. There was 42 feet not analysed. I might add that this permeability is relatively high. The figures used in arriving at this average were all cores in excess of two-tenths of one millidarcy. The range ran from two-tenths to one sample with twelve darceys. With the one, twelve darcey eliminated, it would average out between 65 and 70 millidarcys.

The lithology of the Devonian, as found in this well, is described as gray dense to finely crystalline dolomite with pin-point to large vugs, intercrystalline porosity and fracturing.

The structural features, as we envision them from the information we have, is that the northwest-southeast trending

anticline bounded on the northeast flank by steep dip or possible faulting. There is no original gas contact. Oil-water contact has not been determined. We have hopes that drill stem testing in our second well will tie that point down for us.

The characteristics of the reservoir fluid; the gravity of the stock tank oil is 48.6 degrees API. The saturation pressure is 382 pounds per square inch gauge. The formation volume factor, barrels of reservoir oil per barrel of stock tank oil at original pressure, 1.051; at saturation pressure, 1.088. The viscosity of the reservoir oil at original pressure, .884 centipoise; saturation pressure, .588 centipoise. The dissolved gas-oil ratio, cubic feet per barrel of stock tank oil at saturation pressure is 96 cubic feet.

The reservoir pressure and temperature have corrected all of your reservoir measurements to a sub sea depth of 7550 feet. From a drill stem test on January the 11th, we determined the original reservoir pressure at 4826 PSI. This was a drill stem test pressure taken prior to flowing or testing the well.

The reservoir pressure determined February the 1st, six days after the well was completed, was 4766 PSI. The reservoir pressure on May 9th at the same datum, 4693 PSI. At the time that pressure was taken, the cumulative oil production was 20,082 barrels. The productivity index for this well is 4.4 barrels per day per pound bottom hole pressure drop.

The productive capacity from pressure build-up data, 4230

millidarcy feet.

This, in essence, is all the information we have. With one well, of course, and a relative short period of time, there is a limit of how much information can be gathered, and I might also add that we are not ourselves a large operator in the New Mexico area, and have no other Devonian production.

In evaluating this particular well, we have had to go to other fields in the general area, for the limited information we have. The two closest Devonian fields are the Shoebar and the Anderson Ranch. From what information we have, it appears that the pay characteristics, as developed in this field, are comparable. It does appear that the reservoir fluid we are dealing with is a little different. We have reviewed these other fields, their pressure history, as we have been able to determine from published data, and in each of these instances, apparently a water drive has developed. In neither case have these two fields been operating under an 80-acre rule. However, observation of the map of the development of the Anderson Ranch indicates the operators at their own election have developed on 80-acre spacing.

It's our feeling, and it's perhaps premature, but on the basis of the information we have, that an active water drive will develop in this instance. Of course, time alone will tell. In the event it does, with the pay characteristics that we have, the reservoir characteristics we have, it is our feeling that one well will effectively and economically drain an 80-acre space, or

80-acre allocation, and it is on that basis that we are asking for an 80-acre order in this field.

MR. PORTER: Mr., Duree, do you have any recommendations at this time as to spacing, well locations, and so forth?

A Yes, sir. I am afraid we do not have them written out in the formal form that the Commission is in the habit of issuing them. We have them from the standpoint of the points that we think should be encompassed. We would recommend, of course, that this field be developed on an 80-acre pattern. We would recommend that the spacing pattern be extended to include the area we have outlined on the map in green, and that all wells in the Devonian, in that area be developed under these rules. We recommend that a proration unit of 80-acres be established consisting of two contiguous 40-acre tracts elongated in either direction; that all wells completed in the Devonian be located in the center of the 40-acre track with a surface tolerance of 160 feet for any surface obstructions. I don't know whether I read that right. In the center of either 40-acre track with a surface tolerance of 160 feet, and that either well completed in the Devonian which as dedicated less than 79 or more than 81 be granted an allowable in proportion to the 80-acres assigned. We further recommend that an 80-acre well be given an allowable in keeping with the New Mexico well allowable.

MR. COOLEY: Q Mr. Duree, why do feel that it would be wise to develop on either of the 40-acre tracts in the 80-acre

proration unit rather than on a diagonal or alternate 40, which would give you a somewhat more uniform development pattern?

A It would give you a more uniform development pattern, but in this particular case it is our feeling that all the evidence points toward a water drive. If you tie down a man on his 80-acre tract, you can force him to go to a point that would be less advantageous from the standpoint of the location of the well than he would be were he given this latitude. I think, were you to tie him down, that the individual operators, as they approach the edge of the field, would be coming to the Commission for exceptions in those cases.

Q You do not feel that it would be necessary until they approach the edge of the field?

A No, I don't think think so.

Q You have a substantial area outlined here.

A Yes, sir, which would permit development of very large portions of the pool on a uniform basis if you had staggered or diagonal type of development rather than being located in either one of the 40-acres. Of course, the other side is, as I mentioned earlier, we have a water contact to tie down, so we don't know how far we will go.

Q In your opinion, would a uniform development result in recovery of additional oil in this pool?

A I really don't think it would make a great deal of difference under the drive mechanism.

Q Why do you feel that is so?

A Under a uniform pattern, you are going to force a man to go to a side, or a less favorable location on his 80-acre tract. Under water drive mechanism, of course, you are voiding the oil at the oil-water contact, your oil-water contact is coming up. If that man is on the shallow end or the thin end of his 80-acre tract, you will deplete that well and at the same time he will still have oil under his land. The oil, I think will be recovered essentially with the water drive mechanism, recovered by wells up the structure, but the individual who owns that tract will not recover it.

Q Do you think, in the interest of affording each operator an opportunity to recover his equitable share of the oil and gas in the pool --I mean, the quantity of oil and gas under his tract, that he should be permitted to drill on the best portion of his acreage?

A Yes, sir.

MR. COOLEY: Thank you, that's all the questions I have.

MR. PORTER: Anyone else have a question? Mr. Morgan.

MR. MORGAN: Q Mr. Duree, I notice that your structure map on the proposed unit does not compare with the original structure map?

A It is a little more elongated than it was before the Sinclair well to the northwest hit the Devonian high. The pay development on the top of the Devonian was not present. They went

in, and our geologist can correct me on this if I am wrong, some four hundred feet before they found any porosity that the trend or the elongation of this thing was greater than we had anticipated.

Q Likewise, is the pool larger than it was?

A It is definitely possible that it is larger than we thought it was.

Q Is that the reason you want to expand it?

A Yes, sir. We also feel that 80-acres will give us our recovery, an economical recovery and efficient recovery, and that the drilling of additional wells is not needed to get the oil.

Q You can't find out much about your uniformity from one well?

A No, sir.

Q You can't tell much about continuity of structure either?

A No, sir. We have control points on the northeast, two dry holes over there which give us some control that way. The other direction, we are without control.

Q You are not asking for a temporary order, are you?

A Well, I think that that was a little in error on our part, our thinking being that any order was subject to revision, and I would hasten to say that we would welcome periodic examination of these rules, and I would be more than happy to amend that order for temporary. One thing I didn't mention, this particular well that we have completed was drilled at a cost of three hundred and four thousand dollars. Needless to say, it was a wildcat well,

there were some expenditures in it that will not be repeated in subsequent wells, but we feel that the bare minimum for a well in the Devonian is two hundred and fifty thousand dollars.

Q That includes all costs subscribed to the well?

A That is everything to the well. There are no surface facilities whatsoever other than the Christmas tree and the well head.

Q That does not include the tank batteries?

A That does not include the tank batteries, and I briefly reviewed our history on this well, and the best we could hope for in the way of reclaim out of that particular well would be about fifteen thousand dollars worth of material.

Q Why did you bring Section 4 into this?

A I beg your pardon, we have eliminated Section 4.

Q It is only in the green?

A It is only in the green that we are asking for it.

MR. MORGAN: That is all.

MR. PORTER: Mr. Nutter.

MR. NUTTER: Q Mr. Duree, is this contour map contoured at the top of the Devonian?

A Yes, sir.

Q How many wells to the Devonian were available in this area to permit drawing this map?

A Four.

Q And what is the balance --

A The slopes to the southwest are from seismic work.

Q Does this seismic picture compare pretty favorable with the seismic picture that you had at the time this unit was formed?

A Mr. Nutter, I couldn't answer that, I have our development geologist here who could be better qualified than I would, and I would be happy to relinquish the chair to him, if you wish to ask him that.

Q Well, we will get to some other questions here first.

This average porosity at 6.5 per cent is the porosity for the 40 feet that was cored?

A No, sir, that is the porosity from a hundred and four feet analyzed. There was additional section analyzed that did not have two-tenths of a millidarcy or two per cent porosity, which we did not include. The net is forty per cent of the total section.

Q So you got an average porosity of 6.5 per cent --

A In forty per cent of the Devonian interval.

Q Forty per cent of one zero five?

A No, sir, one zero five is forty per cent of the total.

Q So the total is some two hundred feet or something like that?

A Yes, sir. I have a note here as to exactly what that was. Three hundred and seven feet.

Q So out of the three hundred and seven total feet of Devonian pay, there is one hundred five feet that has an average

porosity of 6.5 per cent?

A Yes, sir.

Q And the average permeability for that hundred five feet is two twenty-six millidarcy?

A Yes, sir.

Q Which includes --

A Which includes that twelve darcy feet.

Q That is --

A One point four foot. That average that you have there is weighted due to the length of the individual sample analyzed and taking it so that you still have a weighted figure sixty-five.

Q Is that a weighted porosity figure?

A Yes, sir, that is weighted due to the length of the individual samples analyzed.

Q What is the oil saturation?

A Apparently it is everything that isn't water, so it will be seventy-seven and a half per cent. The water we have lifted is from the core analysis, and we have not ran capillaries to check that.

Q There will be considerable oil then, in this section?

A Yes, sir.

Q Have you made any estimate of how much oil there would be per foot?

A We have made a number of estimates, and without a recovery mechanism, we are frankly in the dark as to recovery per acre foot. We have stock tank oil in place per foot, acre foot of three hundred twenty-five barrels.

Q Three hundred twenty-five barrels per acre foot?

A Per net acre foot.

Q Per net acre foot? That is, stock tank oil?

A Yes, sir.

Q And at the point where this one well has been completed here, you have a hundred and five?

A One hundred five, yes.

Q What does that figure out for 40-acre or 80-acre units?

A That figures out roughly one million two hundred thousand on 40-acre tracts, or double that in 80.

Q This is recoverable oil?

A No, stock tank oil in place.

Q You indicate you might have a water drive?

A Yes, but we don't know.

Q What is the average recovery in percentage in a water drive mechanism in the Devonian structure?

A As I mentioned before, we have no operations of that type in the Devonian. We would hesitate to go beyond thirty-five or forty per cent under natural conditions.

Q Assuming thirty-five per cent, how much recovery would you have?

A That would be about four twenty on 40-acres, and double that on 80-acres.

Q Mr. Duree, what is the reason for requesting 80-acre spacing?

A The reason for requesting it is that we feel that one well will drain 80-acres economically and efficiently. We don't feel that an additional well in an 80-acre tract will pay the difference in the cost of the well.

Q You mentioned one pool similar to this in your direct examination testimony, that being the Anderson Ranch Pool?

A Yes, sir.

Q Is that pool operating under an 80-acre order.

A No, sir, it is not.

Q Has it been developed on an 80-acre --

A Yes, sir.

Q It is within a unit?

A Yes.

Q Do you think you have enough of a pool in the unit here that you could --

A On the basis that we originally formed the unit, we thought we probably would have. This elongation to the northwest makes it doubtful.

Q You mean your structure?

A Our structure is longer. It appears that it can be longer than we originally anticipated.

Q The average, that is, within the unit, could be developed on 80-acres even though -- even if it weren't an 80-acre order?

A Yes, sir.

Q Does that unit agreement for this South Vacuum Unit provide

for the unit agreement and the unit area?

A I believe it does.

Q Has any effort been made by parties outside the unit to get in?

A Not that I know of. I have had no information of anyone trying to get in.

Q Mr. Duree, in response to some questions by Mr. Cooley, you indicated that perhaps wells could be drilled on a uniform pattern in the heart of the pool, and up in the upper part of the structure, that perhaps that would not be too good a policy, out on the flank of the pool, is that correct?

A That is correct.

Q Is there a possibility that if a well were drilled on a uniform pattern on the edge of the pool, that it might penetrate the pay below the water oil content?

A I think that would be a definite possibility. I cannot say firmly that it will or won't. We still haven't got the edge tied down. Our northwest slope is from seismic data.

Q If we have elongated units, which of necessity they would be elongated, if they were 80-acres, there is a possibility that some of the acreage that would be dedicated would extend beyond that?

A That is entirely possible.

Q Would you elaborate on your Item No. 5 there, the productive capacity from pressure build-up data being 4230 pounds.

A That is calculated from an unsteady flow calculation production curve. We normally solve it graphically. Incidentally, I have those bottom hole pressure data, if you are interested in that. I have sufficient copies of this. I would be happy to put one of these in evidence. I don't have sufficient copies to circulate them all around. It appears I will have to read off this one. This particular graphic representation is the history of a draw down test, and a pressure build-up test. It also includes PIS on the well.. The PI tests were run at the time the well was completed. On the build-up test, the well was shut in at twelve noon on the 3rd of February, with the bottom hole pressure of forty-six hundred and sixty pounds. At the end of ten minutes it was up to forty-seven sixteen; at the end of twenty minutes it was forty-seven thirty-one, at the end of thirty minutes it was forty-seven thirty-two; at the end of forty minutes, forty-seven thirty-three; at the end of fifty minutes, forty-seven thirty-four; at the end of one hour, forty-seven thirty-five; the end of two hours, forty-seven thirty-seven; the end of three hours, forty-seven forty-four, the end of thirteen hours, still forty-seven forty-four. There are also bottom hole pressures on this exhibit. I have an additional build-up test that was ran last weekend.

Q This one will probable suffice.

A This was ran this past Saturday, and at that time it stabilized in one hour. Here is the data. It was flowing at six

p.m., with bottom hole pressure of forty-six fifty-three; at the end of one half hour it was forty-six eighty-five; at the end of one hour it was forty-six ninety-three, at the end of two hours, forty-six ninety-three, and that continued on through thirteen hours and hasn't built up any more.

Q So you figured it was stabilized?

A Yes, sir, and the PI calculated from this bottom hole pressure is four point four given on the tabulated data. At the time we took the flowing bottom hole pressure, it had been flowing for fourteen days at a rate that varied from one seventy-three to one seventy-five barrels per day.

Q Now, Mr. Duree, do you have any idea how much oil would be left in the ground if the pool were developed on 80-acre spacing, which oil might be unrecovered if the pool were developed on 40-acre spacing?

A Well, we don't know the drive mechanism, but we presume it will be water drive. On water drive I don't believe there would be any difference. If there would, there would be less than one per cent because of the inherent flushing efficiency of a water drive.

Q What type of a water drive do you think you will have, edge or bottom water drive?

A It will be either edge or bottom, and until we have some more information on the field I don't know how to guess at it.

MR. NUTTER: I believe that's all. Thank you.

MR. PORTER: Q Mr. Duree, did you encounter any other oil pays in this well?

A Yes, sir.

Q What were they?

A We recovered an oil recovery on drill stem test from the Leonard section.

Q Is the in the Pennsylvanian?

A It is my understanding that it is. Our geologist is here and maybe he can answer it.

MR. FISH: That is permian, lower permian.

MR. PORTER: Is that known as Demon Springs, or is that a different formation?

MR. NUTTER: Is that adjacent to or near the Wolfcamp formation?

MR. FISH: No, it is above the Wolfcamp. The upper Leonard is San Andres, the lower Leonard is your Clearfork-Glorieta sequence.

MR. NUTTER: This is through the Yeso formation?

MR. FISH: Yes, sir, this is right in the transition in the Permian, it is in the transition from your Northwest Shell settlement into the Delaware settlement, so there is an interfingering of San Andres and Delaware sands in the Permian.

MR. PORTER: For the record, will you give us your name.

MR. FISH: George Fish, with Pure Oil Company.

MR. COOLEY: And what is your position with the company?

MR. FISH: I am a development geologist up there.

MR. DUREE: A We also had tests from the Wolfcamp that yield oil.

MR. PORTER: Q How much oil from the Wolfcamp?

A On one test it was open three hours; gas to surface in twenty minutes, recovered eleven hundred and forty foot of oil, six hundred sixty feet of heavy oil, and gas cut mud flowing bottom hole pressure, three forty to six fifty-seven. Final shut in pressure, thirteen hundred pounds, and then we had another test in here on lwer in the section.

Q That's lower than the Wolfcamp?

A Yes, sir. Open three and a half hours; gas to surface, two hours and five minutes; recovered one thousand foot of oil, four hundred twenty-five, minus initial shut in, fifty-seven twenty, flowing bottom hole pressure, two eighty to five ten, thirty minutes, final shut in pressure, forty-seven hundred.

Q What about the Lenoard, what was your test on that?

A Open six hours; gas to surface, eleven minutes; oil, fifty-three minutes, flowed thirty barrels of oil, four and a half hours, surface pressure, two hundred and fifty pounds. Reversed out forty-nine barrels of oil, thirty minutes. Initial shut in pressure, thirty-eight eighty. Flwoing bottom hole pressure, fourteen hundred to twenty-one ten. Thirty minute final shut in pressure, twenty-one forty.

MR. NUTTER: Do you think the drill stem test in those

two areas are sufficient to be able to complete a commercial well in those sections?

A It's awfully hard to argue with a flowing drill stem test, but those pressures dictate a word of caution in approaching it in the Wolfcamp. It is a different pressure. You do not have a flowing test, your final shut in pressure versus your initial shut in pressure showed a draw down, and that looks like, at best, a plug back possibility. The Leonard, I think, before you can throw it out, with that firm flowing test, you would probably have to complete a well and get some reservoir performance data on that drill stem test. I would say you have to be cautious.

MR. NUTTER: Thank you.

MR. PORTER: Do you have a question, Mr. Utz?

MR. UTZ: Yes.

MR. UTZ: Q Mr. Duree, do you have any idea what your pay out would be on two hundred fifty thousand dollar wells?

A No, I do not, I can make some estimate on assumed recoveries or assumed production rates.

Q What about the well you drilled?

A On the well we drilled, I haven't run the exact calculations out. I ran out a number of them. There might be a question, but I didn't run that particular one. I would say it would be some where around two years.

Q Two years.

A Presuming we can sustain our present producing rate.

Q You say two years on the basis of two hundred fifty thousand, or --

A That was based on -- We have produced approximately twenty thousand barrels in three months, that would represent somewhere in the neighborhood of forty to forty-two thousand dollars income, and assuming forty, divided into three hundred, that would be eight times that three months period, or into two fifty, that would be six times that three months period.

MR. COOLEY: Q Sounds like you could pay a well out on the average of two hundred fifty thousand in something like eighteen months to two years.

A Eighteen months to two years.

MR. NUTTER: Q Mr. Duree, do you anticipate you will have any oil left in the ground when you reach that pay out status?

A I hope so. It looks like we will have.

Q Do you have an estimate of how much will be left in the reservoir?

A No, sir, I can only base that on assumed recoveries.

Q Assuming a recovery of thirty-five per cent as we did before, what --

A On thirty-five per cent recovery, we would have somewhere in the neighborhood of two hundred seventy-five thousand barrels on forty acres, four hundred thousand less twenty thousand times six, one hundred twenty from four hundred would give you two eighty. Excuse me, I am wrong, around six eighty-five to six ninety on the

eighty.

MR. NUTTER: Thank you.

A I might also point out that the reservoir fluid is such that we better have a water drive.

MR. UTZ: Q Mr. Duree, do you have any idea as to what the profit is on a barrel of oil produced, all expenses included, except well cost?

A Except well cost?

Q That's right.

A I would have to make a rough calculation here on my own head. I would guess somewhere in the neighborhood of two thirty five, two forty. You got to take the taxes out and your royalty.

Q Two dollars and thirty-five cents or two dollars and forty cents?

A Somewhere in that range.

MR. NUTTER: Q What do you get for oil?

A Three zero two, I believe, right now.

Q Is the price of this oil penalized on account of the high gravity?

A We have to sell it as sour oil, so it is not getting any premium for its gravity. I had hopes where we would have a pipeline situation worked out, but right now we don't have a bit of premium.

MR. PORTER: Q Do you have a pipeline connection?

A No, we truck it out.

Q Where do you truck it out to?

A The Vacuum Pool. I don't know which line it is, Mr. Porter.

MR. PORTER: Mr. Utz, did you have any further questions?

MR. UTZ: No.

MR. COOLEY: Q You probably testified to this, but I missed it. What is the sustained producing capacity of the one well you have completed?

A Sustained producing capacity, I don't know what it is. We are currently flowing it on 6/64 inch choke, that will give you about one seventy-three, one seventy-six barrels. We had it opened up and that added one hundred barrels a day. I think that well can get to the two thousand, three thousand dollar class without any trouble right now.

MR. COOLEY: That's all.

MR. PORTER: Q Too good a well?

A It is a good well. Of course, right now we have no more pressure drop than we have sustained, so the reservoir fluid could account for our energy. Unit we have drawn the pressure down some to establish whether water will enter into this reservoir and relace the oil, we don't know what the drive mechanism is.

MR. PORTER: Anyone else have any questions of Mr. Duree? You may be excused. Let's see, just a minute, I think we better formally enter these exhibits.

A If that is all for me, I would like to enter as Pure Oil Company's Exhibit 1 the map which has been so designated, as Exhibit 2 the tabulation entitled "South Vacuum Devonian Pool", designated Exhibit 2, and the pressure build up tabulation and gravity, so designated as Exhibit No. 3.

MR. PORTER: Without objection, these will be received. You may be excused.

(Witness excused.)

GEORGE FISH

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

DIRECT EXAMINATION

BY: MR. PORTER:

Q State your name, please? A George Fish.

Q State briefly your qualifications.

A I graduated from the Missouri School of Mines in 1952 with a bachelor of Science degree in mining geology, with petroleum geology option. At that time I went to work for the Pure Oil Company as a development geologist and have been employed since that time doing subsurface mapping, isopach well maps, well siteing and general duties of a geologist. I had one year of exploration geology experience with Pure in the Roswell District office, and at that time became acquainted with some of the Devonian reservoirs and the geology in the southeast of New Mexico.

Q You have made a study of this area? A Yes, sir.

Q Your qualifications are acceptable. Is there anything that you would like to add on your own to what Mr. Duree has stated.

A No, sir. I can anticipate some questions. I will just go ahead and let them be asked, if that is all right.

MR. PORTER: Mr. Nutter.

MR. NUTTER: Q Mr. Fish, as I recall, when Union Oil Company requested and had a hearing for the establishment of this South Vacuum Unit Agreement Area, they had a map which was based on seismographic work?

A Yes, that's true.

Q How does this structure map compare with the seismographic map that was available prior to the time that your well No. 1 was drilled?

A That's comparing it with Union's seismic interpretation?

Q Yes, sir.

A It compares favorably in that their seismic work indicated a northwest-southeast trending structure. Our interpretation also shows this trend. The difference, of course, is the extension of the structure to the northwest, and that has been based on the top of the Devonian, and encountered in the Sinclair State Lee 403, in the Northwest Quarter of the Northwest Quarter of Section 22, Township 18 South, Range 35 East. Other than that one variation, I would say that the structure, as encountered in the discovery well, the top of the Devonian encountered in the discovery well

certainly substantiated Union's seismic picture. I believe there was a difference of about two hundred feet at that point. Let me clarify that. I believe we encountered it about two hundred feet higher than Union's seismic work, or seismic interpretation, showed it to be in the map that was originally presented to the Commission.

Q Well, was Sinclair's well up there drilled on the premise that this structure extended up in a northwesterly direction, or was it drilled on the possibility that there was another separate and distinct structure in that area?

A If my memory serves me correctly, I believe that Sinclair's seismic work indicated a different structure.

Q Is there still a possibility that that is another structure up there?

A Yes, that is another possibility.

Q Is there any way of correlating the formations that your well No. 1 in Section 22 -- In the Southeast Quarter of Section 22 has encountered to date to see if this is going to be a high or a low in there?

A No, sir. When we left Fort Worth on Tuesday, that well was drilling at, I believe eleven thousand and five feet, and at that time they had not encountered the Mississippian lime, which would give some indication of structure in that direction. They had tentatively identified the Mississippian Chester from samples.

Q Where do you think that they will pick up the Devonian in that well?

A Well, there has been a variance in the interval from the top of the Mississippian lime to the top of the Devonian in this area in the South Vacuum Unit Well, in Section 35. The interval from the top of the Mississippian lime to the top of the Devonian was approximately seven hundred feet. In Sinclair's State Lee 403 No. 1, that interval was approximately nine hundred feet. On these off structure wells that we have shown and indicated in the legend as having penetrated the Devonian, the normal section from Mississippian lime to Devonian was about eight hundred feet, so there is a variance there of about two hundred feet from top of Mississippian lime to top of Devonian, which gives you a pretty good latitude in predicting the top of Devonian from Mississippian. Taking the average figure, say of eight hundred feet, and assuming that we are fairly close to the Mississippian lime in the Pure No. 1 State Lee "F" in Section -- in the Southeast Southeast of Section 22, I would say that with that approximation you would encounter the Devonian at approximately minus seventy-nine hundred to minus eight thousand feet on the top of the Devonian, which would mean we would have to pull in these contours somewhat from the northeast.

Q Well, if the contours were pulled in, this green line which includes the proposed limits of the pool, might be a little too far to the northwest, wouldn't it

A Yes, that's true. As we have indicated on the map, there is steep dipping to the northwest, with the possibility of faulting. We have nothing definite yet to tie down the position of this fault.

No wells have crossed a fault or have repeated sections or missing sections that would definitely indicate the presence of a fault. We presented this alternate interpretation because there are various wells in this part of the state, some of them which have faulting and some which do not.

Q What is the purpose of drawing the fault in there, because some wells --

A That's an alternate interpretation of the area. We have indicated a possible fault or possible steep dip on the northeast flank of the structure.

Q Is this based primarily on a well which penetrated the Devonian and encountered relatively low --

A Yes, sir, the Trainer No. 1 Reeves in the Southeast Quarter of the Northwest Quarter of Section 23, 18 South, 35 East encountered the Devonian at a minus 8332. Also, in the Northwest Quarter of the Southwest Quarter of Section 31, Township 18 South, Range 36 East, the Shell No. 1 State "RA" encountered the Devonian, top of Devonian at a minus 8521. On the basis of those two wells and the single high point as determined by the No. 1 South Vacuum Unit, which encountered the Devonian at minus 7669, we have interpreted a steep dip or possible fault to the northeast.

Q Is it a character of the Devonian structure in Lea County, New Mexico, to have steep dipping flanks in many cases?

A Yes, sir.

Q So over here in the Southwest where you have no wells

on which to base the contour lines, there is a possibility there are dips of some kind?

A There is that possibility. I believe Mr. Duree mentioned that this dip is seismic control. You have seen the presentation by Union of their seismic interpretation, and Pure also had seismic work in this area, and our interpretation of that work is that the dip is less steep in a southwesterly direction than it is in a northeasterly direction, that is why we have mentioned that this map is based partially on seismic control where we do not have any subsurface control.

Q In other words, the area for which 80-acre spacing is requested is, in a large part, included on the structure on the basis of seismic work which has not been proved by drilling to date?

A That's true.

MR. NUTTER: I believe that's all.

MR. PORTER: Anyone else have a question of Mr. Fish?
The witness may be excused.

(Witness excused.)

MR. PORTER: Mr. Duree, would you come back to the witness stand for more questions.

JACK DUREE

recalled as a witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY: MR. PAYNE:

Q Mr. Duree, in regard to the pool rules proposed by Pure, would you propose that the 80-acre proration unit be entirely within a single governmental section?

A You mean governmental section, or governmental quarter section?

Q Governmental section.

A Governmental section. Well, I think that probably would work out in view of the way the land is divided. Probably the smoothest -- Actually, I don't know, a man's got lines crossing, but it doesn't make much different, it would be entirely up to us. Normally, we try to stay inside the section.

MR. PAYNE: That's all.

MR. PORTER: Anyone else have a question? The witness may be excused.

(Witness excused.)

MR. PORTER: Does anyone have any more testimony to present in this case? Are there any statements?

MR. NESTOR: I am representing Shell Oil Company. Shell is a participant in the South Vacuum Unit operated by Pure, holding approximately a quarter, and we also have some acreage that may be productive one hundred per cent outside the limits of the unit. We would like to urge the Commission to adopt the rules proposed by Pure. We agree that the data are certainly meager at this time, but we see no reason why a temporary order, say for a

year's period, could not be entered to provide for orderly development and to permit us to gather some more information to investigate the drive and to see whether or not such a spacing would be adequate. We too favor flexible location of wells, and again, we hope that this will be a water drive reservoir, since it is obvious there will be very little help from dissolved gas, and if it proves to be water drive, as low ratio reservoirs in New Mexico are, we believe that the flexible method of locating wells will probably recover more oil than a fixed pattern.

MR. PORTER: Mr. Rogers.

MR. ROGERS: W. J. Rogers, with Sinclair Oil and Gas Company. Sinclair has 9.52 per cent working interest in the South Vacuum Unit, and in addition, Sinclair has several hundred acres in the immediate area outside of the unit boundary. We are drilling presently three wells on this acreage. We concur in the rules proposed here by Pure Oil Company, and we suggest that if the Commission thinks that a temporary order should be entered rather than permanent, we suggest it be entered for a period of at least one year.

MR. PORTER: Anyone else have a statement to make for the record?

MR. PAYNE: I have a statement to read into the record, Mr. Commissioner. This statement is presented in behalf of the Ohio Oil Company in Case No. 1442. The Ohio concurs in the pool rules proposed by the Pure Oil Company for the South Vacuum

(Devonian) Pool except that it should be recognized that exceptions to the spacing restrictions may be necessary to prevent waste or to protect correlative rights. It has not been shown that waste will not be prevented or correlative rights be protected by the requirement that a proration unit must be entirely with a single governmental section. The Ohio, therefore, objects to any such requirement for the rules of these pools. Signed J. O. Terrell Couch.

MR. PORTER: Anyone else have anything further to add in this case?


MR. DUREE: We would like to add that in addition to the unit, Pure Oil Company owns other acreage within the area and concurs with their recommendations.

MR. PORTER: If nothing further, the case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings was reported by me in Stenotype at the time and place hereinbefore set forth; that same was thereafter transcribed into typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal, this the 3rd day of June, 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.


Notary Public

My Commission Expires:

October 5, 1960