BEFORE THE
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

IN THE MATTER OF:

Case No. 1634

TRANSCRIPT OF HEARING

APRIL 15, 1959

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I N D E X

BEFORE THE
OIL CONSERVATION COMMISSION
HOBBS, NEW MEXICO

IN THE MATTER OF:

Case 1634 Application of The Pure Oil Company for an order promulgating temporary special rules and regulations for the South Vacuum-Devonian Pool in Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order promulgating temporary special rules and regulations for the South Vacuum-Devonian Pool in Lea County, New Mexico, to provide for 80-acre proration units and well location requirements. Applicant further seeks permission to shut-in its South Vacuum Unit Well No. 3-35 located in the NE/4 NW/4 of Section 35, Township 18 South, Range 35 East, Lea County, New Mexico, and transfer the allowable to its South Vacuum Unit Well No. 1-35 located in the SW/4 NE/4 of said Section 35.

Hobbs Auditorium
Hobbs, New Mexico
April 15, 1959

BEFORE:

A. L. Porter
Murray Morgan
Governor John Burroughs

TRANSCRIPT OF HEARING

MR. PORTER: The hearing will come to order, please. The next case on the docket is 1634.

MR. PAYNE: Case 1634, "Application of the Pure Oil Company for an order promulgating temporary special rules and regulations for the South Vacuum-Devonian Pool in Lea County, New Mexico."

MR. BRATTON: If the Commission please, Howard Bratton,

Hervey, Dow and Hinkle, Roswell, New Mexico, appearing on behalf of the applicant, the Pure Oil Company.

MR. PORTER: I would like to call for other appearances at this time.

MR. NEAL: C. M. Neal of Neal and Neal, Hobbs, New Mexico, appearing on behalf of the protestant Reeves, A. J., D. P., Ezella and Janie P. Reeves. We protest that portion of the application which deals with 80-acre spacing.

MR. PORTER: Anyone else wish to make an appearance in this case?

MR. SELINGER: George W. Selinger representing Skelly Oil Company. We'll make a statement at the conclusion of the evidence.

MR. ANDERSON: R. M. Anderson, Sinclair Oil and Gas Company. We'll make a statement at the conclusion of the case.

MR. SCHRENKEL: Jack Schrenkel, Union Oil Company of California. We will also make a statement at the end of the case.

MR. St. LAURENT: C. P. St. Laurent, Shell Oil Company, Roswell.

MR. PORTER: Shell Oil Company?

MR. St. LAURENT: We'll also make a statement.

MR. PORTER: Mr. Bratton, you may proceed.

MR. BRATTON: If the Commission please, we have two witnesses. Before the witnesses are sworn, I would like to make a very brief statement as to the nature of the case. The case pertains to the South Vacuum-Devonian Pool in Township 18 South,

Range 35 East. The Pure Oil Company has filed an application in which it asks for substantially the four following items: One, temporary special rules and regulations for the pool, the rules and regulations to be in effect for one year. The portion of those rules that is requested is that proration units of 80 acres each be established consisting of two continuous and contiguous 40-acre tracts elongated in either direction. Three, that there would be no increase in allowables for these wells located on 80-acre proration units. Four, permission to shut in one well operated by Pure in this tract, in this pool, for a period of a year to transfer that allowable to an adjoining well, and during that year, to run periodic interference tests to determine the nature of the interference between wells. Those are the requests which we make.

We have two witnesses. Now, I'll ask that they be sworn at this time.

(Witnesses sworn in.)

GEORGE FISH

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, please?

A George Fish.

Q What's your residence and by whom are you employed,

Mr. Fish?

A I am employed by the Pure Oil Company in Fort Worth, Texas as Division Development Geologist.

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

A Yes sir, I have.

Q As a part of your territory, do you include the area in the South Vacuum-Devonian Pool?

A Yes.

Q Are you familiar with that pool?

A Yes, sir, I am.

Q Are you familiar with the application which has been filed in this case?

A Yes, I am.

MR. BRATTON: Are the witness' qualifications as an expert accepted, Mr. Porter?

MR. PORTER: They are.

(Thereupon, the document was marked as Pure's Exhibit Number One for identification.)

Q (By Mr. Bratton) Mr. Fish, referring to the board, the map which has been marked Exhibit Number One, Pure Exhibit Number One, will you go through that and explain to the Commission what it is and what it shows? And I believe the Commission has been furnished copies of these as well as the staff, of these exhibits.

A Our Exhibit Number One is a structure map with contours on top of the Devonian. It shows structural closure in the area of the South Vacuum Pool in Sections 27, 26, 35, all in Township 18 South, Range 35 East. It shows an elongated northwest-southeast trending structure bounded on the northeast flank by a fairly steep dip and possible faulting. Also at the north end of this area of closure, south closure, I'll call it, is indicated a fairly steep dip to the southwest and less steep dip at the south end of the pool. Now, on this interpretation, I have shown two areas of closure with a water level indicated by the dashed red marks. This water level has been established in a previous case, I believe it was heard in January, when the Sinclair Oil and Gas Company requested that their well, Sinclair's State 403 Number 2, located in the southwest quarter, southwest quarter of Section 22, 18 South, 35 East, be converted to a salt water disposal well. The green outlined area is the present South Vacuum Pool limits as determined by the Commission. That description was made in January of this year; since that time, there have been two more wells completed in the South Vacuum-Devonian Pool. That is the South Vacuum Unit 3-35 located in the northeast quarter of the northwest quarter of Section 35, and the South Vacuum Unit 1-26 located in the southwest quarter, southwest quarter of Section 26. The various wells are circled by colors, which indicate the formation they are now producing from. The wells encircled in brown are producing from the Bone Spring Formation, of Permian age,

and are classified as being in the South Vacuum-Bone Spring Pool. The wells encircled in red are producing from the Pennsylvanian and are classified as producing from the Reeves-Pennsylvanian Pool. The wells circled in green are producing from the Devonian Reservoir in the South Vacuum-Devonian Pool, and we have one dual completion, the South Vacuum Unit 2-35 located in the northeast quarter of the southeast quarter of Section 35. That well was taken to granite and was dually completed in the Devonian and the McKee of Simpson age.

Most of the Devonian structural control is afforded by wells on the crest of the structure. There is some control projected in one case from the Pure Number 1 State "F" located in the southeast, southeast of Section 22, 18 South, 35 East. That well was drilled to the Mississippian line and was running low at that point and we did not continue it to the Devonian. However, it had shows in the Bone Spring Formation and was completed as a Bone Spring producer.

My interpretation shows an area of closure that is separated from the larger area of closure to the south. It has one Devonian producer, the Sinclair State 401 Number 2, located in the northeast quarter, northeast quarter of Section 21, 18 South, 35 East. It is separated by structural reversal, afforded, that control is afforded by the Sinclair State 403 Number 2 in the southwest, southwest of Section 22.

Q Mr. Fish, what is the yellow outline on the --

A The yellow outline is the South Vacuum unit area.

Q When going through your Devonian wells there, there are how many completed Devonian wells in the pool?

A There are seven completed Devonian wells. One is outside the present classification of the South Vacuum Pool, but I'm sure it will be included within that limit.

Q The well to which you refer is the what well?

A Is the South Vacuum Unit 1-26.

Q And that well was completed within the last few days, was it not?

A Yes sir, it was completed over the week-end.

Q When was the Devonian Pool, South Vacuum-Devonian Pool first discovered?

A It was discovered in January, 1958. At that time, Union Oil and Gas of California was operator of the unit. They drilled the discovery well.

Q Referring to the map, would you explain where that well is located and the subsequent wells in the order in which they have been drilled, the Devonian wells?

A The South Vacuum Unit 1-35 is located in the southwest quarter, northeast quarter of Section 35. I believe the Sinclair 405 Number 1 was the next well completed in the pool. I am not certain of the order of sequence of the other operators. Pure, as the operator of the South Vacuum Unit, drilled the 2-35, located in the northeast, southeast of Section 35, and then moved northward,

or northwestward, and drilled the South Vacuum Unit 2-35 in the northeast, northwest of Section 35, and out last well completed is the South Vacuum Unit 1-26 in the southwest quarter, southwest quarter of Section 26.

Q Is there anything further you wish to say about the contours, your interpretation of this pool, Mr. Fish?

A Well, it is obvious that my control is largely up the crest of the structure except at the very north end of this south closure where I have some control points and can extrapulate dip down past any water level. And to the extreme southeast where Ralph Lowe drilled the Number 1 Ohio State on the northeast quarter, northeast quarter of Section 1, Township 19 South, Range 35 East, that well afforded some control in that direction so that I have some dip established. Other than those control points, this rate of dip off the flank of the feature is largely interpreted.

Q Is there anything further you wish to explain about the contour map?

A No sir, I believe that's all.

(Thereupon, the document was marked as Pure's Exhibit Number Two for identification.)

Q (By Mr. Bratton) You have drawn on your contour map a line marked "AA" Prime. That indicates the position of the wells on your next exhibit, Exhibit Two?

A Yes, sir.

Q Referring to Exhibit Number Two,the cross section, will you explain what it is and what it shows, Mr. Fish?

A Cross section "AA" Prime is a tracing of the electrical logs through the Mississippian and Devonian sections in the wells indicated. Would you like me to name the wells?

Q Refer back to your contour map. Your cross section goes from left to right and picks up the wells from the northwest to the southeast in order, is that correct?

A That's correct. The first well on the cross section is the Sinclair State 403 Number 2, the second well is the Magnolia State Section 27 Number 1, the third well is the South Vacuum Unit 1-26, the fourth well is the South Vacuum Unit 3-35, the fifth well is the South Vacuum Unit 1-35, the sixth well is the South Vacuum Unit 2-35, and the well to the extreme southeast and which is on the right hand side of the cross section is the Ralph Lowe Number 1 Ohio State.

Q So that the cross section runs roughly from northwest to southeast right through the center of the pool?

A Yes sir, right along the crest of the structure.

Q Now, referring to the cross section, will you explain what it shows, Mr. Fish?

A Well, it shows the electric log correlation. All of these are induction ES logs with the exception of the Magnolia log on the Magnolia State Section 27 Number 1, that was a guard log.

The best correlation is afforded by the gammaray curve, which is the solid line on the left hand portion of the log. The correlation is afforded, best afforded at the base of the woodward shale, which is a highly radio-active shale, and I believe the off-scale readings of the log is pictured here. I have drawn a heavy green line at the top of the Devonian in each of these wells. I have also drawn a heavy red horizontal line at the structural position minus 7880, which is my interpretation of the water level in this south portion of the South Vacuum Pool. It indicates that the productive wells have Devonian section above the oil-water contact, and where the Devonian is encountered below this red line or below the oil-water contact, the well resulted in a dry hole.

Q What does that cross section show, or what do those logs show with reference to the lithology of this pool?

A Well, it shows the continuity of the Devonian Reservoir from northwest to southeast.

Q Through the entire extent of the pool, excluding what is shown as the little separate pool or hicky up to the north?

A That portion of the South Vacuum Pool is not included in this cross section. I believe Sinclair presented a cross section from their State 401 Number 2 down to the State 403 Number 2, thence to the Sinclair State 405 Number 1 and thence to the Magnolia State Section 27. It indicated what is shown on this structure map, that there is structural separation between these two areas of closure.

Q If your cross section were extended to the north into the separate little pool or separate little closure shown there, what would your cross section reflect with reference to dip?

A Well, it would show this same steep dip from the Magnolia State 27 Number 1 to the Sinclair State 403 Number 2, it would show a dip of this degree. I might add that on this cross section scale, the vertical scale is one inch equals one hundred feet, the horizontal scale is one inch equals five hundred feet, so that you have a five to one exaggeration as far as dip goes, but you would see the same steep dip and then you would see a steep dip back up into the north closure.

Q Referring to your Devonian Section shown on those logs, will you explain what the logs show with reference to the section, the composition of the section?

A The logs themselves show a fairly dense interval here within the Devonian. I have to rely on samples and cores to describe the lithology of the Devonian. In our study of the Devonian here, we found that approximately the first hundred feet of Devonian is essentially limestone.

Q That's from top to bottom?

A That's from top to bottom. Within this limestone interval, there are porous dolomite stringers which vary from one foot to six feet in thickness. They are porous, permeable, and are oil saturated where they are encountered above the minus 7880 oil-water contact. Below this first hundred, hundred and ten

feet of dense lime with the dolomite stringers is an interval of dolomite varying from fifty to sixty feet in thickness. This is the main reservoir in this field, it contains the bulk of the reserves. It is porous, permeable, has large vugs, diagonal fractures and it is, in short, it is a good reservoir. You might examine the cross section and you will see that most of the wells or all of the wells that are completed from the Devonian are perforated. This little box with the circle in it is where the perforated interval is and in these wells, most of them are perforated approximately a hundred feet below the top of the Devonian in the main porous reservoir, dolomite reservoir.

Q A summary of your cross section shows that there is continuity of the Devonian section throughout the entire northwest-southeast extent of the pool without any significant variation in the composition of the Devonian structure through that entire area?

A Yes sir, that's approximately what it shows.

Q Is there anything further significant to this hearing which you would like to explain about Exhibit Number Two?

A No, sir.

Q Is there anything further which you have to offer in connection with either of these exhibits, Mr. Fish?

A No sir, I am sure there will be questions about them, and I'll attempt to answer any questions that anyone would care to bring up.

Q Did you prepare Exhibits One and Two?

A Yes sir, I did.

MR. BRATTON: I would like to offer Exhibits One and Two in evidence.

MR. PORTER: Without objection, Exhibits One and Two will be admitted.

MR. BRATTON: I have no further questions of Mr. Fish at this time.

MR. PORTER: Anyone have any questions of Mr. Fish?

CROSS EXAMINATION

BY MR. NEAL:

Q Mr. Fish, did I understand you to say that the water-oil contact had been established in the hearing in January?

A I don't know that it was established, data was presented at that time which is in agreement, I believe, with the data that we have presented here. It, to my mind, it well established the oil-water contact in this south portion of the South Vacuum Pool with the Sinclair 405 Number 1. That well was perforated from minus 7876 to minus 7881.

MR. PORTER: Will you point out the location of that well, please?

A Yes, sir.

MR. PORTER: Thank you.

MR. BRATTON: That well is located in what section?

A That well is located in the northeast of the northwest

of Section 27. It is the lowest structurally located well in the south portion of the South Vacuum Pool. It was completed flowing for 194 plus 74 barrels of water shortly after the water cut increased. The well was put to pumping and I believe one of the first pumping tests was 140 plus 142 water, and according to our record in January, the well pumped an average of 126 barrels of oil a day plus 130 water.

Q (By Mr. Neal) When was that well completed?

A I believe it was completed in July of 1958. The pumping test that I referred to, 140 oil plus 142 water, was made in September of '58.

Q You feel that it is the same structure that the wells from the South Vacuum Unit are drilled into?

A Yes sir, I do.

Q You feel that the structure up north of that, on the north, on north of that is a different structure?

A It is on the same structural trend, the same large structure, but it has separate closure, I believe it has separate closure, I believe that can also be established. The Sinclair 401 Number 2, which is located in the northeast, northeast quarter of Section 21, initially--or was perforated over an interval minus 7818 to 48. It potentialed flowing 434 barrels of oil a day and shortly after that, that well began producing various quantities of water, that was the well that Sinclair was concerned about, I am sure, when they wanted to use their State 403 Number 2

as a salt water disposal well. Our records indicate that in January, the Sinclair State 402--401 Number 2 produced an average of 41 barrels of oil, plus 625 barrels of water per day.

Q Now, your red line that you have there on the lower part of the map, the south end of the map showing the oil-water contact, is it your idea that any well drilled outside of that line will not be productive?

A It will not be productive from the Devonian Reservoir, that's correct.

Q Then there is a substantial amount of the South Vacuum Unit then that in your opinion will not be productive?

A That's correct.

Q That's a radical change from the map that you had at the previous hearing on this?

A No sir, it is not a radical change, the map is very similar to the map we presented at a prior hearing approximately one year ago. The radical change is that we have now established a water level. At that time, we had only one well completed, I believe the South Vacuum Unit 1-35, and numerous wells drilling.

Q But you pulled your eastern line in quite a bit?

A Yes, sir.

Q What control do you have that caused you to pull that eastern line in?

A Well, as I testified previously, the Pure Number 1 State "F" located in the southeast southeast of 22 was taken to the

Mississippian line.

Q What depth?

A At a subsea depth of--I don't have the total depth of it, but the Mississippian line was at minus 7315.

Q Do you consider that a safe control for the Devonian top?

A Yes sir, we did when we stopped the well. We thought that it was a poor risk, a very poor risk, and we didn't desire to take the well deeper.

Q Did you complete it at that point?

A We plugged the well back and completed it in the Bone Spring.

Q When was that drilled?

A Well, there was just one hole drilled --

Q When was it drilled?

A I don't have that date, but I can get it.

Q Was it before the hearing, the previous hearing on this matter?

A That well was drilling at the previous hearing.

Q Do you know what the depth of it was at that time?

A Yes sir, I have a map that I presented at the previous hearing and I can --

Q That's the hearing in May of '58?

A Yes, sir.

Q It was then drilling and had not been completed?

A That's correct.

Q It had not reached the Mississippian at that time?

A I believe perhaps we had reached the Mississippian.

Q And you had these same markers at the hearing before?

A I believe we had reached the Mississippian at the time of the hearing, but possibly not at the time I had prepared my map.

Q But you had at the time of this previous hearing reached the Mississippian top, which is the reason now for you to pull in the eastern side of the water contact?

A I believe, sir, if you will check the testimony at that hearing, that we had a tentative Mississippian top, I don't believe that it was Mississippian line. There is an interval in there, upper Mississippian, which is not a good structural marker. We did have that as the tentative top and I believe at that time, I testified that that well was hung lower than I had shown on my map prepared at that time, and I gave the Commission a rough estimate of the Devonian in my testimony.

Q Mr. Fish, did you testify at the hearing on this application before?

A Yes, sir, I did.

Q On May 14, '58?

A I believe the first hearing was on the 14th. I think when our testimony was presented, it was either the 15th or 16th, it wasn't the first day of the hearing.

Q Mr. Dupre testified?

A Mr. Duree.

Q Duree, D-U-R-E-E?

A Yes, sir.

Q It's Dupre on this. It is true, is it not, Mr. Fish, that at that time you had drilled the southern well of that group of four wells that are in the Vacuum Unit?

A At what time, sir?

Q At the time of the hearing in May of 1958, you had drilled the first one only?

A We had drilled the first well only.

Q You had reached the top of the Mississippian on the north well up there that you completed in the upper formation?

A I believe we had reached the Mississippian-Chester.

Q Since then, you have drilled in succession the three wells that run north and west from one--from the first well in the unit?

A Yes sir, our first well after the completion of the 1-35 was the 2-35. That well was encountered lower structurally than we had anticipated. If you will examine the map I presented at the prior hearing, we thought at that time the closure extended farther to the southeast, so that when we determined that we were getting southeasterly dip, then our next location was the 3-35 where we thought we would be going updip again and in a better structural position.

Q Those wells as you have gone to the northwest have been progressively better, haven't they?

A The last two wells have been a little bit higher; that is, the 3-35 and the 1-26 have been just a little bit higher structurally than the 1-35.

Q And they have had better productive ability?

A They have had comparable productive ability, yes sir.

Q And you have made a location directly east of your 1-26?

A I don't believe we have a formal location; we have a number of stakes driven at various locations.

Q As a matter of fact, the unit operators made a commitment to drill on the east offset to that well?

A I understand they talked to the royalty owners in that direction, I did not know that any firm commitment had been made.

MR. NEAL: That's all.

MR. PORTER: Anyone else have a question of Mr. Fish?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Fish, what real control have you had that caused you to draw two separate structures there in the Devonian Formation?

A Mr. Nutter, the only control I have is that which I have described previously, that is the chief controlling factor here, is the Sinclair State 403 Number 2, which encountered the Devonian low and necessitated bringing the structural contour

lines in to fit that well into the picture, and there is a separate water level which is apparent in the north closure.

Q That water level that is in the north closure is obtained from the one well that is completed in that area?

A That is correct.

Q Now, what would have happened if you had made your cross section run from "A" Prime up to the Sinclair State 401 Number 2 rather than to the State 403 Number 2, what kind of cross section would you have then?

A Well, I wouldn't have the control as afforded by the 403 Number 2, I would have had to have taken the control off of the structure map.

Q Your cross section then would be higher on the left side of the cross section? I mean your Exhibit Number Two there, your cross section, you would show the formation dipping upward to the left constantly, wouldn't you, rather than dipping back down to the left?

A Yes sir, it would have dipped down to a point approximately minus, oh, 7950 and then would have changed dip and would have gone back up.

Q I thought that "A" Prime was on the left side, it's on the right side, though, isn't it?

A Yes, sir.

Q So the dip would be constantly upward on the right side of the cross section rather than dipping down to the right?

A I would have had no control in this area to bring it down. The interpretation from my structural map, if you would illicit a structural map in preparing the cross section, I would have had to reverse dip at approximately minus 7950.

Q I see. Is the water-oil contact in the southern portion of the pool from the well defined--that is, on the southern structure?

A Yes sir, I believe it is.

Q How many wells have encountered water?

A Two wells are making some water. The second well is the Pure--or I beg your pardon, the South Vacuum Unit 2-35, which on the cross section you can see the perforations extend down to minus 7870. In January, '59, that well averaged, flowing, 198 barrels of oil plus 16 water per day.

Q How many wells have actually penetrated the depth of 7880 or more?

A Five wells.

Q Did they all encounter water?

A Yes sir, I believe they did.

Q Is the Sinclair 405 Number 1 Well in Section 27 still producing, Mr. Fish?

A Yes sir, in January of 1959, it produced an average of 126 plus 130, 126 barrels of oil plus 130 barrels of salt water per day on the pump.

Q Would it be possible to dedicate 80 acres to that well

and have all 80 acres within the water-oil contact as depicted on your exhibit?

A No sir, Sinclair acreage which is contained in the northwest northwest of 27 would not have a full 80 acres productive, or 80 acres above the oil-water contact.

MR. NUTTER: I believe that's all, thank you.

MR. PORTER: Anyone else have a question of Mr. Fish?

REDIRECT EXAMINATION

BY MR. BRATTON:

Q There is a common acquafer between the two closures which you have shown?

A Yes sir, the Devonian is the common acquafer and supplies a common source of energy for those two closures.

Q Even though you have two separate closures with your oil separated by the water-oil contact line as you have it interpreted?

A Yes, sir.

Q Now, I believe what Mr. Neal was getting at, basically down in the southern part of the pool, your control is not such that your interpretation of the location of the water-oil contact line or the dip, that is not absolutely accurate, you don't have that amount of control?

A No sir, it is based on later information I have and is my interpretation. When additional wells are drilled and encounter the structure either higher or lower, there will be a

number of changes made in the maps. Geology isn't an exact science and I'm afraid we use the eraser quite often.

MR. BRATTON: I believe that's all we have.

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Fish, I am finally back to the point where I believe that this cross section "AA" Prime reached from left to right, with the "A" being the Sinclair 403 Number 2. Now, if you had used the Sinclair 401 Number 2 as the left end of the cross section, this structure would be dipping or would be going upwards as you proceed to the left on your cross section, Exhibit Number Two, would it not?

A Yes, sir. It would not proceed upward, it would be approximately level through here. If I utilized only the well control that you have mentioned here and did not utilize or recognize this low point in here, if it had been strictly cross section from the Magnolia State Section 27 Number 1 to the Sinclair 401 Number 2, the line at the top of the Devonian would be approximately level. That Devonian top on the Sinclair State 401 Number 2 is minus 7716, the Devonian top on the Magnolia State Section 27 Number 1 is minus 7636, so there would be a slight amount of dip to the north, but of course nowhere the amount that is shown on the cross section "AA" Prime using the Sinclair State 403 Number 2 as my terminal well.

Q Well now, is there any evidence that there is a saddle

separating these two physically or is it merely an indentation to the southwest point of the structure?

A No sir, it is strictly my interpretation.

Q Now, was any seismic picture used in drawing the contour map?

A Yes sir, some seismic information was used down in the south portion of the pool. Our Seismic Section said they are getting, were getting fairly reliable reflections in this area; however, to the north, or the north of our, the South Vacuum Unit 1-26 and in the entire area to the north of that, their reflections were very poor and are unreliable, so I have not utilized any seismic information.

Q So this is all drawn from geologic information that you had available to you from wells that you have drilled?

A That's correct.

Q Now, this possible fault that you have drawn on this Exhibit Number One, the contour lines for the structure don't reflect any fault, do they?

A No sir, I have presented actually an alternative interpretation. I have drawn my structure without faulting. We feel that there is a strong possibility of faulting on that flank and our seismic work indicates that we would expect to cross a fault going from northeast to southwest. There are indications of faulting, that is, there is an area of no record in there which they suspect may be due to faulting. It could be

due to other causes, and therefore I indicated it as a possible fault.

Q Now, I notice a location you depicted in the northwest northwest of 26. Is that a well drilling at the present time?

A I don't believe that well is drilling. That location was announced last Friday and I put it on my map at that time.

Q What formation is that well projected to, do you know?

A To the Devonian, I believe.

Q Prospects are very poor, though, to hit this water-oil contact, wouldn't you say?

A Yes sir, if this map is accurate, then that well will result in a dry hole. I sincerely hope that they do get a well there. Pure has acreage to the northwest and to the southeast of that quarter, and it would also indicate that some of the South Vacuum Unit acreage might also be productive.

MR. NUTTER: That's all, thank you.

MR. PORTER: Anyone else have a question of the witness? You may be excused.

(Witness excused.)

MR. BRATTON: I would like to offer in evidence Exhibits One and Two.

MR. PORTER: Without objection, they will be received.

JACK DUREE

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, please?

A Jack Duree.

Q Where do you live, by whom are you employed and in what capacity, Mr. Duree?

A I live in Fort Worth, employed by Pure Oil Company in the capacity of Chief Production Engineer for the Texas Production Division.

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

A Yes sir, I have.

Q In connection with the application now pending, are you familiar with the South Vacuum-Devonian Pool and with the application which has been filed in connection therewith?

A Yes, sir.

MR. BRATTON: Are the witness' qualifications acceptable?

MR. PORTER: Yes, sir.

Q (By Mr. Bratton) Mr. Duree, you have made a study of the South Vacuum-Devonian Pool and the physical properties there of the pool?

A Yes, sir.

(Thereupon, the document was marked as Pure's Exhibit Number Three for identification.)

Q (By Mr. Bratton) Referring to Pure's Exhibit Number Three, which is a sheet, small sheet of reservoir data and which is not on the board, will you briefly go through that and explain what it reflects as to the characteristics of the South Vacuum Pool?

A Exhibit Number Three, entitled Reservoir Data, gives a number of properties relative to the reservoir rock and fluids found in the South Vacuum-Devonian Pool. Physical properties of the reservoir rock, porosity of 7.1 per cent, an average permeability of 226 millidarcys, average interstitial water saturation, 32.5 per cent, net thickness, 75-foot maximum. Lithology, it's a grey dense to finely crystalline dolomite with pin-point to large vugs, intercrystalline porosity and fracturing.

Q Mr. Duree, before you get to the physical properties, from what wells were those taken?

A This information is from cores taken on the Pure, the South Vacuum Unit Well Number 1-35, Number 2-35 and Number 3-35.

Q Those are the three southernmost wells shown on the cross section, Devonian producing wells?

A Yes, sir.

Q If you will continue.

A All right. The structural features have been already covered by Mr. Fish; that is, the northeast-southwest trending anticline. The characteristics of the reservoir fluids, and

this is determined from fluid samples taken on the South Vacuum Unit Well Number 1-35. Gravity of the stock tank oil, 49 degrees API, saturation pressure, 382 pounds per square inch gauge, formation volume factor at original pressure, 1.051, at saturation pressure, 1.088. Viscosity of the reservoir oil and centipoise, original pressure, .884, saturation pressure, .588. Dissolved gas-oil ratio, 96 cubic feet per barrel of stock tank oil. Reservoir pressures and temperatures, at a datum depth of 7750 feet sub-sea, the original reservoir pressure was 4,895 pounds per square inch, the estimated average reservoir pressure on April 15, 1959, 4758 PSI, reservoir temperature, 148 degrees Farenheit. Productivity index, again from the 1-35, is 4.4.

Q Now, referring to first the physical properties of the reservoir rock, what does that show by way of permeability, is that good permeability for effective drainage?

A We think it is excellent permeability for effective drainage.

Q Your findings correlate with those of Mr. Fish as to the characteristics of the Devonian Formation; that is, the permeability in the upper section and the lower section?

A Yes, sir.

Q Referring to your characteristics of the reservoir fluids, I take it from the low saturation pressure, the fact that there is practically no gas in this oil, that you are confident there is no gas solution drive, no gas and solution?

A The gas solution is extremely low and the amount of energy that could be expected from the gas and solution for practical purposes is nil.

Q What do you think is your producing mechanism and why do you believe so?

A We believe the producing mechanism is that of water drive. Water moving into the reservoir is shoving the oil out ahead of the water. This is borne out by the fact that we have been able to determine water levels in the reservoir; we also have two wells that are producing water.

Q What does the viscosity of your oil indicate to you, Mr. Duree?

A It indicates the viscosity is very low; therefore, it is easily displaced out of the reservoir or system, comparatively speaking.

Q From the reservoir data which you have assembled, what does it indicate to you as to the area which a well will drain in this pool?

A It indicates to us that a well in this pool will drain any acreage that is structurally lower than it is, whether that be 40, 80, 160. Under a water-drive mechanism, if you take a high point, you are going to get the oil.

Q You think your permeability is good and your mechanism is such that you can efficiently drain 80 acres?

A Yes, sir.

Q Is there anything further you would like to say with regard to your reservoir data?

A No, I have nothing further on it.

(Thereupon, the document was marked as Pure's Exhibit Number Four for identification.)

Q (By Mr. Bratton) Referring to the board and what has been marked Pure's Exhibit Number Four, will you explain what that exhibit is and what it reflects?

A Exhibit Number Four is a graphic production history of the South Vacuum Field since its discovery. On it is posted the bottomhole pressure, the daily oil production, the daily water production, the cumulative oil production and the number of wells. The production data is complete through January, the number of wells has been extrapilated to reflect the well that was completed this past week-end. This data is complete for all wells that are carried in the South Vacuum-Devonian Field with the exception of the Sinclair 401 Number 2. It has been in our interpretation. That is on a separate structure and we have not included its production on this graph.

Q You have attached to it a small exhibit, a compilation which reflects the information which is reflected on the graphic form?

A Yes sir, this is the tabular data from which the graph was made.

Q What would be the effect if you included the Sinclair well, what would it affect on your graph and in your figures?

A Well, on our total cumulative production, for instance, as of January the 1st, it is shown as 122,000 barrels. With the Sinclair 401 included, it would be 151,406, approximately 29,000 additional barrels, which would increase this cumulative figure slightly. The water production, which is shown as 31,202 barrels, would be 50,037, an increase of approximately 19,000 barrels. The gas increase would be from 9,000,000 to 12,000,000.

Q What is the significance of the cumulative data in the graphic representation insofar as this hearing is concerned, Mr. Duree?

A The only significance is that it reflects a pool in the early stages of development. The indications are, from what we have to date, that where we do have a water drive, that it is in the early stages of development, and that's about all that it does show.

Q All right, sir.

(Thereupon, the document was marked as Pure's Exhibit Number Five for identification.)

Q (By Mr. Bratton) Now, referring to Exhibit Number Five, Mr. Duree, will you explain what Pure Exhibit Number Five is and what it reflects?

A Exhibit Number Five is a graphic representation of

bottomhole pressure determinations made on each of the wells in the field since it has been discovered. On the left margin are the pressures, the horizontal is time, the insert map shows the wells from which the pressures have been taken. They are color coded and that color code on the map will follow through in the color of the lines and the circles on the graphic history on the top of the graph. The initial well completed in the South Vacuum Pool is the South Vacuum Unit Number 1-35. The small graphs, exhibits which have been passed out, carry a tabulation of the actual pressures from which this graph was posted. The initial pressure indicated in the 1-35 was past 4895 pounds. That pressure was determined by bottomhole drill stem test equipment prior to any production from the reservoir. The second pressure posted here with a red circle is the pressure from the 1-35 after a cumulative production of 862 barrels, which shows we had a bottomhole pressure of 4,838 pounds per square inch. Subsequent points give the bottomhole pressure that has later been determined on this well with cumulative production of 20,400 barrels, the bottomhole pressure was 4765. The third cumulative is 4819 with 33,000 barrels cumulative production, and with 73,000 barrels, the pressure was 4767. The second well completed was the Sinclair 401 Number 5. We did not have an original pressure determined from a drill stem test on this well. As of the first pressure we have on it, the well had produced 4,276 barrels; it had a bottomhole pressure of 4759. At the end

of 15,000 barrels production, it had a pressure of 4773. The third well completed was the South Vacuum Unit 2-35, and in this instance, again we were unable to get an initial pressure on drill stem tests. At that time, we had no production from the reservoir in that particular well. The bottomhole pressure was 4828 PSI. That particular well, as pointed out earlier, went on to the Granite and subsequently completed in October. We took another pressure on the cumulative production of 5283 barrels and the bottomhole pressure at that time was 4,762. In January of this year with a cumulative production of 24,788 barrels, the bottomhole pressure had declined to 4757. The next well completed in the South Vacuum Pool was the Magnolia State Number 1. We have a pressure determination on it with a cumulative production of 1,082 barrels, it showed a bottomhole pressure of 4810. The next one is the Vacuum Unit 3-35. Our first pressure determination with it was after 734 barrels of production with a 4796-pound pressure. We took three pressures there immediately on it to check it and find out that--the last one was 1600 barrels production with a pressure of 4775. Our last well is the South Vacuum Unit 1-26, which was potentialed this past week-end. A pressure determination on it finished this Monday showed a bottomhole pressure of 4792 with a cumulative production of 235 barrels. The trend is that the subsequent wells that have been completed after the initial one have consistently shown lower pressures in keeping with the pressure that the reservoir had been lowered to

by earlier production, even though the well itself may have had no production from it.

Q Will you demonstrate in the large map, roughly, the line of the decline in pressures, say starting in July of '58?

A You mean the decline in pressure of the field as a whole?

Q Well, of the field as a whole and particularly the wells as they have been brought in, the later wells?

A The later wells, the Magnolia State Number 1, completed in November, came in some forty pounds below the initial reservoir pressure from the 1-35. The South Vacuum Unit 3-35, its initial pressure is some fifty-five to sixty pounds less. The South Vacuum Unit 1-26, some ten pounds more than that.

Q You mean ten pounds less?

A Ten pounds greater drop in it than the 3-35.

Q Excuse me. Referring to the location of these wells you have shown on the insert, the distances between these wells, and referring back to the contour map, these wells are located on what would be 80-acre spacing or 80-acre patterns, are they not?

A With the exception of the Sinclair 405 Number 1.

Q What is the significance of this map, Mr. Duree, of this chart? Is this not the proof of the pudding as far as drainage is concerned?

A In our opinion, it is proof that we have drainage

in this field. We are losing reservoir pressure, we are losing it at a spot where no production has been taken. The only way we can lose it is the fact that other wells have produced, and having produced, are connected in the reservoir to the spot where we drilled, have removed--or have caused the pressure to go down.

Q Due to the decline in those pressures and the locations of the wells from which those pressures were taken, does this exhibit, in your opinion, prove that one well will efficiently drain 80 acres?

A Yes sir, it does.

Q Is there anything further you would like to say with regard to this exhibit, Mr. Duree?

A No, I have nothing further to add.

Q All right, sir, if you would--now, Mr. Duree, we are not here claiming that a well on 40 acres based on the current information would be ineconomic?

A No sir, we are not; there is a possibility that it might be.

Q What is the, briefly, the economic situation of the pool?

A The economic sitiation of the pool is that all evidence to date indicates we have a water drive developing and that we can pay out a well on 40 acres, we can pay out a well on 80 acres. The only thing that could be questioned on that would be if the water drive did not develop. It would be entirely possible

for the field to operate a period under an apparently strong water drive and then have this drive fail. It would be a function of how large the aquafer is which is supplying the water into this reservoir to displace the oil. If the aquafer is sufficiently large, we should be able to deplete the reservoir; if it is not sufficiently large, then we will have to either supplement that energy or our total recovery will suffer.

Q Would there be any detrement either by way of waste or violation of correlative rights by the granting of one year temporary rules and regulations in accordance with the request which you have made?

A I do not think so, no.

Q Specifically, will you relate what we are asking for and why we are asking for the specific items we have requested?

A We are asking for temporary special rules for the South Vacuum Pool for a period of one year. We are asking that those rules set up 80-acre spacing with the 80 acres allocated made up of two adjacent and adjoining 40-acre tracts. We recommend that the operators be given lattitude as to which end of the 80 he locates his well in. We are asking no increase in the allowables for these wells; we think they can carry an 80-acre allowable very handily, but we would like to leave them as they are for the duration of these temporary rules. And as a correlary to this, or another part of it, grant us permission to shut in one of our Devonian wells for this period and transfer its allowable. By

doing that, we will have one well with no production coming from it, we can take pressure determinations from that well through the year and with those pressure determinations, we feel that we will bear out even further this information that we have developed, that the reservoir is all inter-connected, if this well with no production will lose reservoir pressure the same as those wells that are producing.

Q And you are asking for these rules, even though in your opinion the evidence now is conclusive to satisfy you that one well will efficiently and economically drain 80 acres?

A In my opinion, it definitely will.

Q In your opinion, will the granting of the application of Pure's prevent waste and protect correlative rights?

A Yes, sir.

Q Do you have anything further which you would like to state at this time?

A No sir, I have nothing further at this time.

Q Did you prepare Exhibits Three, Four and Five?

A I prepared them; they were prepared by me in part and under my direction for the remainder.

MR. BRATTON: I would like to offer Exhibits Three, Four and Five in evidence.

MR. PORTER: Without objection, Exhibits, Pure Exhibits One through--Three through Five will be received.

Does anyone have a question of Mr. Duree?

CROSS EXAMINATION

BY MR. NEAL:

Q Will you explain, please, sir, how the proposed 80-acre spacing will prevent waste?

A Mr. Neal, on 40-acre spacing, we are going to have to go out and drill a lot of very questionable locations. We are going--by our drilling on 80's, we can cut down on the development costs in this field tremendously.

Q How does it prevent waste?

A Well, that's economic waste.

Q You don't mean to infer that it would lessen the production of oil?

A I don't think that it will lessen the production, I think the production under the rules we have proposed would be the same under 80's or 40's.

Q Now, how would it protect correlative rights?

A I didn't say that --

Q You testified in your opinion that 80-acre spacing would advance the cause of protecting correlative rights. How?

A Well, it's giving each and everyone equal opportunity to get their production.

Q Wouldn't they have the same opportunity with 40-acre spacing?

A They would not have the same lattitude there.

Q They would have the same opportunity to drill?

A They could always drill, yes.

Q And there is no question in your mind but what they can be economically drilled from the standpoint of out and out profit on 40-acre units?

A I don't believe my testimony was that. On the basis of the information we have now, yes. But also on the basis that it is a water drive and will take time to determine whether or not we are connected with a sufficiently large aquafer to deplete the reservoir, it could be that we would produce for a year or two years and then suddenly we would lose our drive mechanism.

Q And then you would have to go to 40-acre spacing?

A No, I didn't say that, I said that we would have to supplement the energy of the reservoir.

Q Or go to 40-acre spacing?

A I don't think that 40 acres would do it.

Q Do you think that there could be a situation here where you would have to go to 40-acre spacing?

A I don't think so, no.

Q In other words, you think that there is no question but what a well on 80 or a well on 160 acres would drain the oil out of the pool?

A Provided you get high on the structure.

Q Then why didn't you apply for 160-acre locations?

A Because we are not--this structure is not sufficiently wide that we have quite that much room.

Q Is it sufficiently wide for 80-acre spacing east and west?

A We think it is.

Q East and west is a place where you could have one new well in an east-west location the way you've got it there, one or two wells?

A Two wells.

Q And at no place could you have over two, in no place could you have as many as three wells lying east and west?

A Oh, yes.

Q Down at the bottom end of it?

A Yes, sir.

Q And that's the low end of it?

A I beg your pardon?

Q That's the low end of the field where --

A The south end of the field.

Q That's the part of the field that you testified in May had 105 feet of effective production in the Number 1 Well, that it had six and a half per cent porosity and 226 millidarcys of permeability. Now you say it's seventy-five?

A I also had--that information was based on one well, this information today is based on three wells.

Q All right. Now, the information today based on three wells is shown in sections other than where the Number 1 Well was?

A And also the core analyses show the same amount of net

pay.

Q What amount of net pay does that show?

A I believe you just testified seventy-five feet.

Q Well now, some of it is as great as a hundred feet and some of it is six feet thick right up on the upper edge of it, scattered in the upper line?

A Yes.

Q And some of them are as much as six feet thick?

A I am sure they are; I have no argument with that testimony.

Q That's the bottom part of the 60-foot sediment?

A I do not believe it's a 60-foot bed--yes, but it has variations within it.

Q And you think you only have seventy-five feet of average effective production?

A That's correct, for the field.

Q That's based off cores from what wells?

A The 1-35, the 2-35 --

Q The 1-35 is the one you had before?

A Yes, sir.

Q What was your core on the 2-35?

A Well, the 2-35, the average permeability from cores was 171 millidarcys ranging from two tenths to 1200. Footage, I do not have recorded here.

Q And on the Number 3?

A On the Number 3, 223 millidarcys.

Q What was your footing?

A I don't have it here, I can get it from my file.

Q Well, in order for it to average on those three wells, Number 2, Number 3 and Number 1, for it to average out to 75 feet, it had to be about fifty feet, wouldn't it?

A Roughly that; I could get the exact figures.

Q That's not consistent with Mr. Fish's testimony about how much dolomite you had there, is it?

A Well, Mr. Fish's testimony goes as to how much dolomite was in the area; I was testifying as to what constituted pay on the basis of core analyses, of porosity and permeability.

Q Now, Mr. Duree, if 80-acre spacing is allowed to you, the only person who would be served by that is the lease holder, isn't it?

A I fail to see that.

Q Everybody else would lose money and lots of money?

A I fail to see that.

Q You do. Tell me, how many wells do you think will have to be drilled on 80-acre spacing to drill up this area?

A To drill up the area?

Q Yes.

A Around seventeen or eighteen.

Q And on 40-acre spacing, it would take twice that many?

A No, it wouldn't be twice, quite twice that many.

Q How many?

A It would be my guess from twenty-eight to thirty.

Q And so you would have some ten or twelve wells more that would be drilled on 40-acre spacing?

A Yes.

Q More than on 80-acre spacing?

A Yes.

Q A maximum of twelve wells?

A Yes.

Q How long does it take to drill one of those wells?

A Around six to seven days.

Q And how many men are engaged in that operation?

A In drilling that well?

Q Yes, sir.

A Well, in round figures, I would guess eighteen to twenty-two.

Q How many men, service men in all does it take to maintain the drilling of a Devonian well?

A This would be purely a guess, I would guess that you would average, maybe, over the term of the thing, two men.

Q Isn't it a fact that drilling concerns in drilling a well of that kind for the industry in the community, that it is the equivelent of the employment of about forty men in the drilling operation?

A Mr. Neal, on the average, that may be correct.

Q Well, we are dealing with averages. That's what you are dealing with here on your bottomhole pressure, isn't it?

A My question is, I am not arguing that point with you.

Q And it takes sixty days--we are talking about who benefits.

A I know.

Q That's part of it, that's what you say, it makes this something that prevents waste. You are talking about it being a benefit, more economical to the producer.--

A Yes, sir.

Q --to drill and thereby the producer is prevented from wasting his money, is that right?

A He is prevented from--he doesn't have to spend his money there--he can spend it again some other place.

Q If he spends his money there on that operation in a drilling program on 40-acre spacing where it is economical to do so, as you have said it is here, then each time he drills one of those wells, the economy of the community benefits to the extent of the employment of forty men for sixty days, right?

A The community has income coming into individuals in it for that period, yes.

Q All right, then if you multiply that by twelve, it has twelve times that much impact on the community, doesn't it?

A Yes, sir.

Q All right. Now then, on the State, it has the impact of payment of taxes on that additional production, doesn't it?

MR. BRATTON: If the Commission please, I hate to object to this line of questions, but I don't believe that this line of questioning is pertinent to the establishment of a proration unit under the rules and regulations of the Commission. I don't believe that, although it might be a great benefit to Hobbs if a hundred Devonian wells were dug in this area, that that falls within the Statute, 65314, which is the statute that the Commission takes into consideration in determining a proration unit.

MR. NEAL: If the Commission please, I think there has been a predicated statement that this prevents waste entirely on an economic benefit to the lessee. Now, I think we are entitled to consider the economic benefit to the royalty owner, the State and the community and I would like the Commission to let me go ahead with my line of questioning.

MR. PORTER: The Commission sustained the objection.

MR. NEAL: I'll approach it this way if I may then, if the Commission please.

Q (By Mr. Neal) The State of New Mexico is the principal royalty owner --

A Yes, sir.

Q --under this unit?

A Yes, sir.

Q The Reeves family is the owner of the only other royalty within the limits of the South Vacuum Unit, right?

A That is correct.

Q The revenue to the State of New Mexico by way of royalty becomes a part of the permanent school fund, does it not?

A It is my understanding, I am not acquainted with New Mexico to that extent.

Q In farm security?

A I do not know.

Q But if we assume that that is true, it will take the State of New Mexico twice as long to get its ultimate recovery of money from royalties in the South Vacuum Pool if you are permitted to establish 80-acre spacing than if you would drill on 40-acre spacing, is that right?

A That is entirely correct, the distribution is correct. We have stated we were asking for a continuation of the 40-acre allowable for this one-year term and no reclassification to normal 80-acre allowable even though we feel the wells are very capable of producing that and until that would double, it would be some period longer.

Q If you received your normal 80-acre spacing, it will be approximately 40 per cent longer?

A Roughly 40 per cent.

Q Forty per cent longer; then the State public school fund would lose the interest on that royalty income that they would

otherwise have, by reason of it being extended out over a longer period of time before they increased --

A They would lose the interest from it.

Q And that would be a substantial loss to the State, wouldn't it, and to the school fund?

A I haven't had occasion to figure out how much it would be.

Q Well, if it was on one of these wells out here, the royalty would run roughly $25,000.00 a year, wouldn't it?

A I haven't sat down and figured it out, so I wouldn't be right on the magnitude.

Q And if you would lose 40 per cent of that, that would be some sixteen or seventeen thousand dollars a year that would be lost to the permanent school fund?

A Right, approximately.

Q And how long do you think it would take to exhaust this field?

A I frankly don't know. If we are correct on what we have now, it will take somewhere in the neighborhood of seven to twelve or fourteen years.

Q On 40 or 80-acre spacing?

A That range covers both.

Q We have fourteen years --

A Fourteen to ten on 80, eight to ten on 40.

Q About sixteen thousand dollars, sixteen hundred dollars

a month for seventeen wells for fourteen years that the State would be losing interest on investment, wouldn't it?

A There would be some interest lost, on that I'll agree; on the magnitude of it, I haven't calculated it out, so I wouldn't know the figures.

Q On the cash value of the royalty to the private owners, the Reeves family, royalty values are ordinarily calculated, are they not, on the basis of the amount of revenue they bring per month?

A That is taken into account.

Q And values are ordinarily established conservatively at a hundred times the monthly royalty, right?

A I have heard that figure mentioned, I personally --

Q That's the rule of thumb that you use quite a bit in this Devonian production, right?

A I personally have had no occasion to use it; I wouldn't argue with it.

Q Building on 80-acre spacing as opposed to 40-acre spacing would result in the income of the private royalty owners not members of this unit being reduced by 50 per cent, wouldn't it, if you assume their acreage is productive?

A I believe it would be about 40 per cent.

Q Well now, you mean 40 per cent if you had the normal 80-acre allowable?

A That's right.

Q But on what you were asking for for the first year --

A For the first year, that would be about right.

Q It would be that much?

A Right.

Q And then it would be 40 per cent?

A Yes, sir.

Q So the granting of this order to you would reduce their value, their cash value or royalty by 40 per cent, wouldn't it, on the market?

A Assuming that that monthly income is correct, yes sir.

Q So you are the one that benefits, and the only one, the State loses --

A It --

Q The State loses?

A The State is losing to the extent of the interest. The other side of that particular coin is that the State has--if we don't spend the money there, we have it for other developments in this State.

Q You have it for other development in the State or for the stockholders, either, don't you?

A Our stockholders, we hope to give them some money. In recent years, last year they didn't do so well.

MR. NEAL: That's all.

MR. PORTER: Any further questions of Mr. Duree?

MR. NUTTER: Yes, sir.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Duree, I believe you stated that you didn't have the complete files in your Numbers 2-35, 3-35?

A I didn't have that, no. I have the averages here, which I read.

Q How about the porosity for those two wells, do you have that?

A I don't have it here written down, no. I'll say that, that we averaged out the permeability and it happened that it worked out the same as it did on the 1-35, it's approximately the same, six to seven and a half per cent.

MR. PORTER: Mr. Nutter, let's take a few minutes' recess.

(Short recess.)

MR. PORTER: Mr. Nutter, I believe you were questioning the witness at the time we had our recess.

Q (By Mr. Nutter) Mr. Duree, I have been comparing your reservoir data sheet with the reservoir data sheet you submitted at the hearing last May.

A Yes, sir.

Q And I note several things that are dissimilar about it. I wonder if this reservoir has changed or if maybe these were just corrections. For instance, I note for one thing that the gravity last year was 48.6 and now it is reported as 49. Now,

is that actually a change in gravity that you have had?

A Mr. Nutter, I presume that was a correction that was made in rounding the figure on it four tenths of a degree API. In looking at this thing and bringing it up here today, I took the opinion of yielding a little bit and going four tenths of a degree API. There is no change in the reservoir fluid.

Q I see. Now, in Item Five, Reservoir Pressures and Temperature, I note that last year you stated that the original reservoir pressure was 4826 and now you state that the original reservoir pressure is 4895. What's the difference there?

A Mr. Nutter, the datum depth, do you have that on the recording from last year? The original datum was taken at 7550; subsequent to that time, the Commission used 7750, which we should have used originally as that's nearer the center of the perforations, and that's a correction in the datum depth. It's the same pressure, or rather, from the same information.

Q So that would account for pressure readings, original pressure readings as well as current pressure readings that are here?

A Yes sir, this 7750 puts it approximately at the mid-point on the perforations on the first well.

Q I see. Mr. Duree, you haven't gone into this item of reserves on value of the oil underlying 40 acres or 80 acres from this at all?

A I have not.

Q Is the reason for that the fact that you feel that one well drilled on 40 acres would pay off?

A Yes sir, I stated in the hearing here that provided the field continues exactly as it is now and as long as you don't have any trouble with the water at any point throughout, and it would also pay out on 80.

Q You also mentioned in your direct testimony, Mr. Duree, that whether the well would pay out on 40 acres would probably depend on your aquafer being large enough to cause your production rate to be sustained, is that correct?

A I said that that could very easily differ and we didn't--it would be a matter of time. That same line of reasoning can make the 80-acre location uneconomic.

Q Do you know of any Devonian Pool in Lea County of similar nature to this pool in which the aquafer hasn't been large enough to sustain production?

A Mr. Nutter, I know of some Devonian reservoirs to the south part of the Lea County area that operate under a completely solution gas drive; to the north of the area we have here, they are apparently, from our information, primarily water-drive reservoirs. On the basis of that, we have hopes that it will be a water drive, but we are in between the two general areas.

Q Is there more indication that this is a solution gas or a water drive at the present time?

A At the present, the information indicates a water

drive; it is more indicated than it was at the last hearing.

MR. NUTTER: I believe that's all, thank you.

MR. PORTER: Anyone else have a question of Mr. Duree?

REDIRECT EXAMINATION

BY MR. BRATTON:

Q Mr. Duree, at the time of the previous hearing, you had no estimate of the oil-water contact line, is that correct?

A We did not know where the oil-water contact was.

Q Now, is it your testimony, Mr. Duree, that if this field is developed on an 80-acre spacing pattern, there will be ultimately recovered as much oil as there would be if it were drilled on a 40-acre pattern?

A Under the rules we have proposed, yes.

Q What is the cost of a Devonian well in this pool?

A Approximately $275,000.00.

Q And therefore, if you drill unnecessary wells in this pool, they will cost $275,000.00 initial investment plus the further cost of operating those wells?

A That is correct.

MR. BRATTON: I believe that's all.

MR. PORTER: Anyone else have a question of the witness?

RECROSS EXAMINATION

BY MR. FISCHER:

Q Mr. Duree, that South Vacuum Unit Number 3-35, is that a top allowable?

A Yes, sir.

Q Flowing?

A Yes, sir.

Q This Number 1-35, is it a top allowable also?

A Yes, sir.

Q Essentially, you would be transferring, if you got permission to transfer the allowable of the 3-35 to the 1-35, you would --

A We would be taking a double allowable from one well.

MR. FISCHER: Thank you.

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Duree, what would be your recommendation on how the Commission should handle the wells which due to the steeply dipping structure that we have here, in the existence of a water-oil contact, may not have 80 productive acres which could be dedicated to it, how should the Commission handle that?

A Well, there's only--the Commission, of course, would have to handle it, it would have to be from the approach, from the standpoint if it doesn't have 80 acres, it shouldn't be entitled to 80, it should be entitled to some fraction thereof.

Q Would that be the case of the well, the Sinclair State 405 Number 1 in the northeast of the northwest of Section 27 there?

A Presumably that would be the way it could be handled, yes.

MR. NUTTER: Thank you.

MR. BRATTON: Mr. Porter, I would like to ask one question.

MR. PORTER: You might ask the Sinclair representative if his thought coincides with that thought.

MR. BRATTON: I wouldn't think it would.

REDIRECT EXAMINATION

BY MR. BRATTON:

Q What would you propose by way of interference tests and how would you propose that that be handled in connection with the shutting in of the one well, Mr. Duree?

A We would propose that the well be shut in and the other wells continue to produce and we would take pressures--I beg your pardon, I started off wrong. We would initially shut in all wells in the unit, we would prefer if we could get the other operators to do it also, shut in their wells in the unit, and determine a 40-hour bottomhole pressure. Then we would start all but our one well to produce, we would probably, for the first week, take pressures on that shut in well each day, then at the end of a month, we would take pressures on that well plus the producing wells on 24-hour shutin and we would repeat that each month and then after three or four months if we are not getting enough draw, we might have to drop back to every month and we would have this one well with no production that we would be taking pressures and taking pressures on the other wells to make a

comparison with.

RECROSS EXAMINATION

BY MR. NEAL:

Q With respect to the question asked about the allocation of acreage to wells that didn't have an 80-acre producing unit, I direct your attention to the property of the Reeves family. According to your oil-water contact, there's only 40 acres of that productive?

A That is correct.

Q And you would say that they would be entitled on that well to only half the allowable?

A That is correct, if the interpretation there is borne out by the well.

Q It is a fact that the owner of that lease has committed that acreage to the unit, isn't it?

A The working interest owner.

Q The working interest owner, and isn't it a fact that the royalty interest owner has not?

A Yes.

Q It is a fact that in addition to paying royalty to the royalty interest owner, the owner of that lease will also be required to pay royalty to the State of New Mexico on the production?

A Yes.

Q That would permit you to reduce your royalty payments

to the State on that Reeves acreage that you would otherwise have to make by 50 per cent?

A Well, it would reduce the royalty paid because of the lease oil produced from the tract.

MR. NEAL: That's all.

MR. PORTER: Anyone else have a question of Mr. Duree?

You may be excused.

(Witness excused.)

MR. PORTER: Anyone else have testimony to present in the case?

MR. NEAL: If the Commission please, I would like at this time to have the Protestants to submit two exhibits.

(Thereupon, the documents were marked as Protestant's Exhibits Numbers One and Two for identification.)

MR. NEAL: The instruments have been identified as Protestant's Exhibits Number One and Two, Number One being the order which was entered by the Commission in the former hearing of this case, which was Case Number 1443, Order Number R-1188, and the transcript of the testimony of Mr. Duree and Mr. Fish at that hearing which was held in May of 1958.

MR. PORTER: Is there objection to Counsel's motion?

MR. BRATTON: We have no objection.

MR. PORTER: They will be admitted.

MR. NEAL: I would like permission to withdraw the exhibits

so that others can be substituted.

MR. BRATTON: We have no objection.

MR. PORTER: That will be permissible, Mr. Neal.

Anyone else have testimony to present in the case? Any statements?

MR. BRATTON: I would like to make a brief closing statement, Mr. Porter, but rather than opening and closing after the statements, if the Commission is agreeable, I'll just close at the end of all the statements.

MR. ANDERSON: R. N. Anderson, Sinclair Oil and Gas Company, I have a closing statement. Sinclair does not necessarily concur in all aspects with the Pure Exhibits, but we have made a study of our own pertaining to this field and we concur with Pure in their recommendations with one exception: We concur that flexible 80-acre proration units should be adopted and we concur with their request to shut in one well, transfer its allowable to another well. We do not concur that the 40-acre allowable should be retained with temporary 80-acre units. We ask the Commission to use the State-wide 80-acre allowable for wells of this depth. We do not feel it is too high and we feel that it is applicable to wells in this field.

Thank you.

MR. PORTER: Mr. Anderson, I want to ask you how much acreage you think ought to be attributed to the Sinclair well--I won't ask you that.

MR. ANDERSON: I would say that I have not studied their exhibits with that in mind, but I would be very much surprised if our structure map were exactly the same as theirs.

MR. PORTER: Do we have a statement from Skelly?

MR. SELINGER: If the Commission please, my name is George W. Selinger and I represent Skelly Oil Company. Generally, we concur in the conclusions of the applicant with respect to a temporary 80-acre unit. There are several interesting angles to this that I would like to take upon myself to answer, if I may. Mr. Nutter has raised the question of allowables, which I feel under the Applicant's proposals has no place at this hearing, which leads to the conclusion that every 80-acre proration unit must be productive. Under the Commission's authority, Definitions, you have the right to fix the spacing of wells. The Applicant here proposes a temporary spacing of 80-acre units. That doesn't necessarily mean, in view of the fact that they recommend a 40-acre allowable, that they are asking for an 80-acre proration unit. They are asking for the temporary spacing on the basis of 80 acres which you have the authority, you have the right to fix, and they are asking for that on the basis of a, on a temporary basis, depending upon the development of the additional wells in the field.

As the Commission well knows, the evolved purpose from a reservoir standpoint of development is to determine the perimeter or the outline of a field as quickly as possible. It is also

well known throughout the industry by all those familiar that you can determine your perimeter and the limits of your field with the same number of wells more quickly on 80 acres than you can with 40 acres.

Another question that was raised is with respect to correlative rights of royalty owners. As I understand, the Protestant in this case here represents a few royalty owners. There are other royalty owners, and the question of protection of correlative rights is raised. Well, we all know that as to spacing under your statutory authority that you've got to establish a uniform spacing plan, that the heart or the center of the field is generally the area that is more quickly developed. Now, if you have 40-acre development in this field now and don't permit a period of at least a year to secure this additional information, you'll find that the center or the heart of the field as it is developed on a density of one well on 40 acres, and you will likewise find as a necessary correlary, that the edge, the farther edge of the field is developed on a wider spacing due to the nature of the reservoir. So that you will find that instead of protecting correlative rights by going to a 40-acre development program right now, in my opinion you will protect the correlative rights of all the royalty owners, not necessarily just a few, along the edge. And incidentally, our acreage is on the edge, but you will find that you will protect the correlative rights of all the royalty owners, including the State, on the basis of the

wider spacing until such time as you can secure this additional information and data.

Now, I have always maintained that this flexible program of temporary spacing, which is in great use in other States, particularly in North Dakota where they issue every field on temporary spacing for an 18-month period from the completion of the wells, but I have always felt that when this Commission issues a temporary spacing order for the purpose of securing information on the reservoir, you are playing it safe. That is, if it is a wider spacing and you find you have made an error, you can always correct it, but if you don't allow the industry to have that additional time to secure that information and you deny them that right to do that, you are setting the spacing indefinitely, that is, forever on the basis of 40 acres and that can never be undone, so therefore, we urge this Commission to grant the application of the Pure Company for a temporary period of one year for the development on an 80-acre spacing program.

MR. PORTER: Anyone else have a statement?

MR. SCHRENKEL: Jack Schrenkel representing Union Oil Company of California. Union is one of the owners of the South Vacuum Unit and concurs with the request of Pure Oil Company for temporary 80-acre spacing. Prior to this hearing, we have examined the pressure and production history of the field, and in our opinion, the bottomhole pressure indicates pressure communication over areas of at least 80 acres. Considering the bottomhole

pressure performance of this field and the performance of similarly developed fields in Lea County, we believe 80-acre spacing will efficiently drain the field.

MR. St. LAURENT: C. P. St. Laurent for Shell Oil Company. Shell Oil Company, as operator in the South Vacuum-Devonian Field, concurs in the temporary field rules proposed here by Pure Oil for the efficient and prudent development of the South Vacuum-Devonian Field.

MR. PORTER: Will you spell your name for the reporter?

MR. St. LAURENT: The last name is S-t. L-A-U-R-E-N-T.

MR. PORTER: Anyone else have anything to offer in this case? Mr. Neal?

We will take the case under advisement.

MR. BRATTON: If the Commission please, I would like to make a brief closing statement.

MR. PORTER: I believe Mr. Payne has a letter to read into the record.

MR. PAYNE: Magnolia Petroleum Company also supports the Pure Oil Company in their application and wishes their letter concurring to be introduced in the record as an exhibit. However, I believe that that is up to Mr. Bratton, whether he wishes to introduce it as an exhibit or not.

MR. BRATTON: I don't believe we care to have it as an exhibit in the record, just so it goes into the record as a normal procedure.

MR. PAYNE: All right, sir, the letter will become a part of the record.

MR. BRATTON: If the Commission please, on behalf of the applicant, I would like to say a few words in closing. I believe what we have proposed here today is unique in 80-acre spacing in New Mexico. We have proposed a one-year period during which we would conduct interference tests, I believe that that is unique in oil production in New Mexico, but we have proposed a one-year period during which we would conduct interference tests which would give further information to the Commission and to us as to the pool. We believe, however, that we have proved as of today, by the bottomhole pressure decline curve which we have shown, that there is effective reservoir communication in this pool over areas greater than 80 acres. I am no engineer, but I understand from the engineers that in determining the area that will be drained, your pressure decline is the actual proof of the pudding whether you are getting communication and draining the area. What we have shown in our Exhibit Five, we believe clearly demonstrates that one well will efficiently and economically drain 80 acres in this pool. We believe further that our interference tests will corroborate this information which we have presented today. We believe further that we have gone a step further than certainly any hearing that I have known by requesting that--or by suggesting that the allowables remain the same. In other words, that we not receive increased allowables during the one-year period. We believe

that with the combination of these requests, that we have presented a completely satisfactory solution to the problems in this pool.

Now, referring to the direction of the objection of the Protestant, I believe I need only point out the fact that we are talking in terms of wells that cost $275,000.00. I don't believe it is the intention of this Commission to increase the cost per barrel of oil in this State by requiring the drilling of unnecessary wells to recover the oil.

Mr. Duree testified that the same amount of ultimate oil will be recovered. I would like to point out to the Commission the provision of the statute with which I am sure the Commission is aware. In speaking of proration units, the statute refers in addition to the protection of the correlative rights of the royalty owners. It states that the Commission shall consider the economic loss caused by the drilling of unnecessary wells, the avoidance of the augmentation of risks arising from the drilling of an excessive number of wells. I believe that this Commission cannot and will not adopt a philosophy that oil should be instantaneously mined from the ground so that everybody may immediately receive his share of the oil. Of course, you can carry the argument to either extreme, to that or to the extreme of one well draining the entire pool.

We believe that what we have presented here today is a sound basis for the Commission to grant the application which

Pure has made in this case.

MR. NEAL: I would like to make a statement in conclusion as to what was said, if the Commission please. It is true the statute authorizes the Commission to space this so as to not require the drilling of unnecessary wells based upon economic loss. The only economic loss that has been talked about here is the additional cost that would be required of the operators to drill the additional wells, which he admits would be profitable to him. There's no consideration being given in any of the testimony of the applicant to the economic loss that would be caused to the royalty owner or to the State by 80-acre spacing, and in the consideration of whether or not it prevents waste on an economic basis, certainly it should be approached both from the light of the leaseholder and from the light of the State and the light of the royalty owners in this case, both the State of New Mexico and the Reeves family.

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

We will take the case under advisement.

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, JERRY MARTINEZ, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing were reported by me in Stenotype, and that the same was reduced to typewritten transcript by me and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

DATED this 8th day of May, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Notary Public

My Commission Expires:

January 24, 1962