BEFORE THE

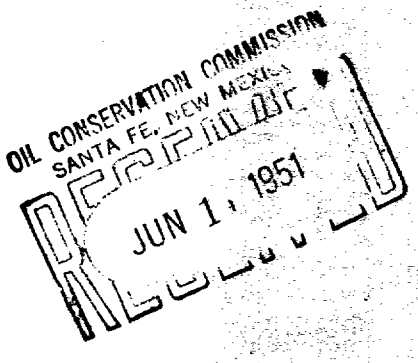
OIL CONSERVATION COMMISSION

May 22, 1951

TRANSCRIPT OF PROCEEDINGS

IN

CASE NO. 269



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CASE No. 269: This is an application by Phillips Petroleum Company for 80 acre spacing for the Siluro-Devonian production found in the J. M. Denton No. 1-A, Section 11, T. 15 S, R. 37 E.

MR. E. H. FOSTER: Mr. Commissioner, we have three more exhibits we would like to place there on the wall. May we continue that before we get started?

MR. SPURRIER: Yes, sir.

MR. FOSTER: Mr. Commissioner, on our application we would like to make a little amendment to it from the operational feature as to the location of the wells to the requirement that they be located northwest and southeast on the 40 acre tracts of each quarter section. We want to provide for the uniform spacing of the wells in the center and northwest and southeast.

MR. SPURRIER: Does everyone understand the proposed amendment? Is there any objection to it?

MR. FOSTER: Here is a drafted amendment. I just ask that it be inserted in the present application in lieu of the last sheet. I might say that I believe there have been some additional wells that have been drilled and some additional wells that have been located since this application was filed that are not described in the application itself. But as the

facts are developed regarding those wells, I would like to have it considered that those wells are described and included in the application as of today.

MR. W. A. SCOTT: Mr. Chairman?

MR. SPURRIER: Yes.

MR. SCOTT: We object to the northwest southeast proration units. We are in favor of operational development on the 40 acre tract until the structure is defined and the limits of production are established.

MR. FOSTER: You don't have any objection to making the amendment, you just object to the fact that is the way we want to do it?

MR. SCOTT: Yes.

MR. FOSTER: I want to make a little short statement here. We worked with most of the operators regarding the proposed 40 acre spacing in this field. I believe that most of the operators are favorable toward the 80 acre spacing. I am not attempting to speak for anybody but Phillips. I know we are favorable to it. We do have some opposition here from one operator at least. Whether there will be any opposition from others, I don't know. I want the Commission here to regard our request for the 80 acre spacing as a sincere effort on our part to show the pattern on which this field really should be developed. We are certainly not motivated by any desire to injure or hurt any other operator in the field or royalty owners. If we are mistaken about our position that 80 acre spacing should

be adopted in the field and if as a result of that position any oil should be lost, of course, we stand more chance to suffer loss in that respect than any of the royalty owners would, since every time they lose a barrel of oil we are losing several. So, I don't believe anybody could very well accuse us of attempting to do something that would be against the royalty owners interest.

We will stress in this hearing--I thought I would outline briefly for the record--we are going to stress the steel shortage. Of course, I think everyone is familiar with the fact that there is a serious steel shortage due to the National emergency and we will attempt to show that by going to 80 acre spacing that great quantities of steel, which is very critical at this time, can be saved. We are asking that this order be for a period of one year. That is what I would call a temporary order. However, I do regard every order that is entered by this Commission as being a temporary order. Temporary at least to the extent that this Commission always retains jurisdiction over the production of oil and gas in the various fields in this state and temporary to the extent that any order that is entered, whether it specifies that it is for one year or longer or shorter period can always upon anybody's motion, any interested party's motion, or upon the motion of the Commission itself be amended.

We have a number of exhibits here that have been prepared

and our first witness will be Mr. Nicola, O. P. Nicola. I am not going to try to drag this hearing out. I am going to let the witness do most of the talking and I am not going to try to direct the whole current of the examination just on questions and answers. I am going to ask him to take them in the order in which he desires, to present them, explain them to the Commission and Identify them and we will offer them for the record. Then, after that, if any one wants to cross examine, and I suppose there will be some cross examination, then they may do so. I am going to try and shorten the matter as much as I can since I understand there are some other hearings here that will take some considerable time. I am sure that everybody wants to get through today.

JACK M. CAMPBELL: I think it is proper for me to make a statement here at this time in order that the Commissioners may understand our position in the matter.

MR. SPURRIER: Proceed.

MR. CAMPBELL: I am Jack M. Campbell representing McAlester Fuel Company. As the Commissioner knows, McAlester Fuel drilled the discovery well in this field some 18 months ago. For this company particularly, it was a major discovery and the Commissioner can be assured that they have paid close attention to the production history in this filed during that 18 months period.

McAlester Fuel Company feels that where reservoir

conditions and fluid characteristics and the recovery, reservoir recovery mechanism provides adequate history and economics are suitable in the field and the rights of all the property owners in the field can be protected, that there should be a maximum spacing pattern under accepted practices, with proper restrictions to the rate of production. We are opposed to 80 acre spacing in this field particularly because the temporary period for which this order is now set has already elapsed. The field has been on 40 acre spacing.

Generally, the locations that are now drilling and have been established have, in the most part, been on a 40 acre offset basis.

As I view the northwest southeast fixed pattern program now proposed by Phillips they, at the outset, have to seek eight exceptions in this field from this order if issued. I do not know if they contemplate asking for those exceptions at this time or asking for them at the future hearing. But eight of the present locations, as I view the situation, locations of wells are now off pattern and would require exceptions and special hearings on the allowable given in those cases where the wells are not drilled on the pattern.

At this time, we understand that there are 7 wells in this field that have been completed, the 7th well, I guess has not been completed, it has been drilled to a water-oil contact. There are 12 locations for wells and there are several state. I say, generally speaking, those have been on 40 acre basis. Mention was made of the steel shortage. I

think everybody in the oil business is naturally concerned about that. It is our position that the evidence here will show that the nature, the thickness, the formation, the pay section in this field from the point of view of national defense and the proper allocation of steel both, from economics of the company and security of the country could not be better placed than in this pay section in the Denton Field.

We, too, will undertake to make this testimony as brief as possible but we consider that this is a matter of considerable importance to the State and the operators in this field and we hope that we can present as briefly as possible a record of the production that we have in the production field.

(Witness sworn.)

O. P. NICOLA,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. FOSTER:

Q For the purpose of the record, will you state your name please?

A O. P. Nicola.

Q You reside at Bartlesville, Oklahoma?

A That's correct.

Q You are employed by the Phillip's Petroleum Company?

A Yes.

Q In what capacity?

A As a proration engineer.

Q What is your educational training and background?

A I graduated from Lee High University in 1925 with a degree of Engineer of Mines. I specialized in geological studies. Since that time I have been engaged entirely in the oil business in different capacities.

Q Have you had an occasion to become familiar with the field that is under consideration here this morning?

A Yes, I have. I have made a study of the reservoir information available in this field.

Q And does that include all of the wells that are in the field in your study?

A That includes all the wells that have been completed and on which information is available.

Q The purpose of your study has been to determine whether or not the Commission should adopt an 80 acre spacing in the field?

A That's correct.

Q And you are prepared at this time to explain the information that you have gathered and make your recommendations here to the Commission?

A Yes, sir.

Q All right. Now, Mr. Nicola, I don't want to take time asking you a lot of questions. You have placed here on the wall a number of exhibits. I am going to ask you to go to these exhibits and make your explanation as to what is represented by these exhibits and the source of your information reflected by these

exhibits and to just narrate as quickly as possible the facts reflected by each one of these exhibits. At such time as I think proper, I will break in and ask you some questions about it. As you go to your exhibits there, please number them beginning with number one, refer to them as Phillip's Exhibits No. 1, 2, and so forth.

A My first exhibit is a plat showing the area surrounding the Denton field and is simply constructed with a red outline showing the area which we have asked the Commission to space.

Q In other words, that is the territory, extent of the field, as indicated thereon?

A That is in our opinion the limits of the field as far as we can tell and possibly includes some land which is outside of the productive limits. But we have tried to make it as feasible as possible.

Q Everybody knows this, but for the purpose of the record, I want to get into the record there the number of wells that are in this field at this time that have been completed and are now producing.

A To our knowledge there are six wells presently completed in the Denton Devonian Field and 16 wells either drilling or as locations.

Q Will you indicate the names of the operators that are in that field?

A The Ralph Lowe, Phillips Petroleum Company, Ohio Oil Company, McAlester Fuel Company, and Gulf Refining Company. Atlantic

Refining Company is in partnership with Phillips.

Q Those that you name include all the operators that are in the field that are interested in the question that is before the Commission of 80 acre spacing?

A Those are all the operators that have wells now completed and producing. Skelly has a well about to go on production.

Q Are there other operators that have wells about to be completed?

A I think the Atlantic has a well that is about to be completed, their No. 1-T well.

Q Any others?

A I don't know of any offhand right now.

Q Now go to your next exhibit.

A Exhibit No. 2 is a Bar Graph showing first the tons of steel required to complete each of four devonian wells in this field and the average tonnage is 258½ tons. Using a very conservative area of approximately 3360 acres out of the entire spaced area of 8640 acres, we find that on 80 acres spacing as compared with 40 acre spacing we would save 42 wells or a total of ten thousand eight hundred fifty-seven tons of steel.

The lower part of this exhibit shows the cost of drilling four wells in the Devonian reservoir and the average cost is $273,000.

Q Just a minute. Before you leave that exhibit No. 2. There is a steel shortage is there not?

A That is what I understand.

Q And steel is regarded as being critical?

A Yes, sir.

Q And would you say that the effort to save the tonnage of steel there would be one that would result in a benefit to the operators in the field?

A In my opinion, yes.

Q All right. Go ahead.

A Phillips Exhibit No. 3, is production summary not shown on the wall, a tabulation of the entire pool by months from October 1949 to March 1951, showing monthly oil and gas production, cumulative production of each and the weighted average gas-oil ratios.

Q Will you just state what those figures are so that everybody here may know?

A The total accumulated production of the entire reservoir as of March 31, 1951, was 280,000 barrels of oil and 353 million cubic feet of gas. The gas-oil ratio during March 1951 weighted average was 1211 cubic feet per barrel.

Q All right.

A Phillip's Exhibit No. 4 is a tabulation of bottom lhole pressure data. On four wells in the field the Gulf Chamberlain No. 1, The Ralph Lowe Dickinson No. 1, the McAlester Denton No. 1 and the Phillip's Denton No. 1. There are five pressures shown on Gulf's well, two on McAlester's well, and one each on the other two wells. All pressures are corrected to a datum of minus 77hundred feet subsea.

Q Mark that as four please.

A The shut-in time prior to taking these static bottom hole

pressures is also shown on this statement.

Q Now, Exhibit No. 5.

A Just a second. I would like to direct the Commission's attention to the pressure measurement on the Phillip's No. 1 Denton, taken on the completion date of this well, March 31, 1951, and which was 48 hundred and seven pounds per square inch. This measure is about one hundred and eleven pounds per square inch below the estimated original reservoir pressure but is identical with the latest pressures of the Gulf No. 1 Chamberlain and McAlester's No. 1 Denton wells. Since Phillip's No. 1 Denton well is over one half mile from the nearest of these other wells it is evident that the reservoir underlying these three wells is the same and that drainage and loss of energy has occurred over a distance considerably greater than the eighteen hundred sixty-seven feet between wells which will result when wells are drilled on an 80 acre alternate 40 acre spacing pattern.

Phillip's Exhibit No. 5 is a graph showing field data plotted against time. It shows number of wells completed, oil production, bottom hole pressure, and gas-oil ratio. The flat oil, gas-oil ratio cover is indicative of an under-saturated reservoir which is operating at a pressure above the bubble point and the gas-oil ratios of 1100 cubic feet per barrel is the same as the soluable gas in it.

The graph also reveals a small drop in the bottom hole

pressure while oil production is increasing, which indicates that the formation is highly permeable.

Q Having a highly permeable formation would that lend itself to 80 acre spacing?

A Yes, sir.

Q Phillip's No. 6.

A Phillip's Exhibit No. 6 is a graph on which we have plotted bottom hole pressures against the accumulated production of the entire pool. The almost negligible decline in this curve illustrates the extremely efficient operation of a large volume reservoir of high permeability.

Q Before you leave that Exhibit N_o. 6, the information reflected on that Exhibit No. 6 as reservoir conditions in the field lend itself to 80 acre spacing?

A Yes, sir.

Q All right.

A The next Exhibit No. 7 is a conventional solubility-shrinkage curve prepared from laboratory investigation of the behavior of the bottom hole sample of reservoir fluid from the Phillip's Denton No. 1 well. The sample in the closed cell is subjected to gradual reduction of pressure from 5550 pounds per square inch, which sample was obtained at 12,300 feet or a datum of minus 8510 subsea down to zero pounds per square inch. The following information was obtained: Saturation pressure or bubble point where the first free gas comes out of solution, is 2540

pounds per square inch. The reservoir now contains no free gas and the reservoir fluid will remain entirely a liquid until the bottom hole pressure declines from 5050 per square inch to 2540 pounds per square inch, a drop of 2510 pounds per square inch from the present pressure, during which time large volumes of oil will be produced.

There are 1066 cubic feet of gas dissolved in each barrel of reservoir oil.

As the pressure declines from 5050 pounds to 2540 pounds per square inch, each barrel of oil will expand 1.547 times ten to the minus fifty power fraction of the barrel. And the expansion of this oil and the connate water of the reservoir plus any water drive is the only source of energy by which oil is now being produced.

This curve also indicates that the formation volume factor at saturation pressure is 1.64.

Q Now, as regards 80 acre spacing, what conclusions do you arrive at from that exhibit and the information on it?

A Simply from that exhibit that in conjunction with future exhibits, I would like to add that before making a comment.

Q Go ahead.

A Phillips Exhibit No. 8 is a core analysis summary obtained by Core Laboratories of Dallas from a core from the Ohio Oil Company Denton No. 3 well which well is a diagonal southeast offset to Phillip's No. 1 Denton well.

The information obtained by this core analysis, conventional number of feet of permeability productive formation recovered,

permeability, porosity and oil and connate water saturation.

Phillip's Exhibit No. 9 is a graph on which we have plotted the bottom hole pressure measurements on three individuaL wells against the accumulated oil production of each well at the time each pressure measurement was taken. The curve in black was then drawn through theplotted points to show how pressures behave as oil was withdrawn. It is found that initially, until a pressure differential had been established, each well performed as if it were producing from a separate reservoir of not exceeding 80 acres in size. However, after some ten thousand barrels had been produced from each well and the pressure had dropped about 70 pounds per square inch, the curve begins to flatten out with less and less pressure drop per barrel of oil produced. This indicates that the inertia of the reservoir fluid had been finally overcome, the pressure differential extending farther and farther back into the reservoir, with more and more liquid expanding and contributing this energy of larger and larger volumes toward the maintenance of pressures at the wells under consideration.

Also, on this graph will be noted a straight red line dipping steeply with respect to the original curve. This red line represents the way the curve would be expected to behave if either of the three wells would drain no more than 80 acres. This prediction is based on the following calculation.

The calculation is Exhibit No. 10.

Q Before you get started, I want you to tell first how that calculation was made, that is, the source of information.

A Yes, sir. I intend to do that.

Q All right.

A This calculation is for the purpose of finding out the number of barrels of stock tank oil produced, which would be expected to be produced from a well in the Devonian Reservoir, Denton, per square inch drop in bottom hole pressure, assuming the well could drain only 80 acres. The calculation is based upon porosity, oil and water saturation, and productive thickness obtained from Exhibit No. 8, The Ohio Denton No. 3 core analysis, and also upon the compressibility, or expansibility, of oil and salt water and the formation volume factor which would be obtained from laboratory determinations, and for the oil compressibility we refer to Exhibit No. 7. The connate water compressibility or expansibility has been obtained by other laboratory work.

I won't attempt to go through the entire calculation.

Q No, I understand.

A But, it reveals that one well could be expected to produce only 98 barrels of stock tank oil per pound square inch drop in pressure if that well were able to draw its energy and its oil from only an 80 acre tract.

I would like to compare this with the performance of Gulf's No. 1 Chamberlain, for which five pressure--performance points are shown on Exhibit No. 9. This well has produced 851.7 barrels of stock tank oil per barrel of pound drop in reservoir pressure.

Q Right there let me interject a thought. In other words, that Ohio well there that you are talking about, the Gulf well I mean, that you are talking about, has produced considerably more oil than you would expect it to produce if it was draining from less than 80 acres?

A That's right, considerably more. Several times as much oil.

Q And the conclusion from that is that, of course that one well there will drain as much or more than 80 acres?

A In my opinion, one well would drain the entire reservoir.

Q I understand, but at least it will efficiently drain 80 acres?

A Yes, sir. The high permeability, the large connected volume of this reservoir leads us to recommend that an allowable for each well on an 80 acre unit should be established by the Commission at twice the top unit allowable for 40 acres with deep well adaptations.

Q That, as stated in barrels would be what?

A That would be 590 barrels per day per 80 acre unit. Which is twice the present unit allowable per day.

Q In your opinion would the adoption of that allowable result in waste in the field?

A No, sir. Certainly not at the present time, from the information that we have on the reservoir.

Q All the information that you have at the present time indicates that you could maintain that rate of production

from these wells in this field without correction of under ground or above ground waste?

A Well, certainly for a considerable length of time.

Q At least for a year?

A At least for a year.

Q All right.

A Since it is now apparent that the Lowe No. 1 Dickinson well is producing from the same common source of supply as the other Devonian wells in the Denton Pool, it is recommended that the allowable of the Lowe No. 1 Dickinson well, with 80 attributed acres, beassigned the same allowable as the remaining wells in this reservoir and that same be based upon twice the 40 acre allowable with the deep well adaptations heretofore assigned to such other wells and based upon the depth of the discovery well in the McAlester Fuel Company Denton No. 1-A.

Q That would be 590 barrels, would it?

A Yes, sir. In further support of the requested allowable we offer the following productivity index tests of two widely separated wells in this reservoir in which tests reveal that such allowable rates are justified and can produce without waste.

Productivity Index Test, Phillip's Petroleum Company Denton No. 1 well. At a flowing rate of 650 barrels per day through a one-quarter inch choke, the productifity index was 2.5 barrels of oil per day per pound drop. At a flowing rate

of 214 barrels per day through a 1/8th inch choke the productivity index was 2.4 barrels of oil per day per pound drop. The other test is on the Lowe No. 1 Dickinson well flowing at a rate of 387 barrels of oil per day through a 14/64th inch choke. This well had a productivity index of 2.556 barrels of oil per day per pound drop.

Before any allowable is assigned, I recommend that the Commission require the operator to furnish a plat showing the 80 acres attributed to such well and which 80 acres can be reasonably shown to be productive.

Finally, I would like to offer Phillip's Exhibit No. 11.

MR. CAMPBELL: If the Commission please, may I ask a question about the allowable. Are you seeking that allowable at this time?

A Yes, sir.

MR. CAMPBELL: I don't believe it was in the notice.

A I think we asked to establish an allowable.

MR. McCORMICK: To be determined by the Commission.

A To be determined by the Commission. This is a recommendation. Finally, we offer a plat, Exhibit No. 11, showing suggested 80 acre units. It is not intended that these suggested units be required by the Commission but the exhibit is designed to show that even with wells clustered as they are in certain

areas, it is possible to assign 80 acres to each such well. It is also recommended that exceptions be granted as to location for all wells heretofore completed or now drilling in the Denton devonian field with further exceptions due to the suggested units on Gulf's Chamberlain lease that Devonian wells be permitted upon the attribution of 80 acres to each well, the same to be located in the northeast quarter of the southwest quarter of Section 14 and in the southwest quarter of the southwest quarter of Section 14, Township 15 South, Range 37 East.

Q Regarding that Exhibit No. 11, that is just a suggestion on behalf of Phillips Petroleum Company as to how the 80 acres unit can be formed, is it not?

A The idea of introducing the exhibit was simply to show that it can be done.

Q I understand. You are not saying that is the way it ought to be done?

A No, sir. That will be up to the operators themselves.

Q It just illustrates that 80 acres can be assigned to each well in the field?

A Yes, sir.

MR. FOSTER: That is all.

MR. SPURRIER: We will take a five minute recess.

(Recess.)

MR. SPURRIER: Mr. Foster, are you ready or are you through with your direct examination?

MR. FOSTER: I am through with my direct examination.

MR. Spurrier: You willing to stand for cross?

MR. SELLINGER: I have one question. I am with Skelly Oil Company.

Q (By Mr. Sellinger) Referring to your Exhibit No. 11, Mr. Nicola, that is your suggestion as to the workings out of the 80 acre units on existing wells that are producing and drilling and locations, is that correct?

A Yes, we have taken each well as already located and tried to establish a possible unit pattern which could be followed.

MR. SELLINGER: Your recommendation of a pattern of wells of the northwest and southeast applies insofar as your Exhibit 11 is concerned except where the producing, drilling and locations differ than the northwest southeast pattern and along with your recommendation you are asking for an exception to those wells that differ to that pattern?

A Yes.

MR. SELLINGER: I believe that is all.

MR. CAMPBELL: Mr. Nicola, I understand your application now is that the Commission issue a temporary order for a period of one year for fixed pattern drilling on an 80 acre basis in the northwest quarter and the southeast quarter of each quarter section in the Denton Pool.

A That's correct.

Q You are not now undertaking to have the Commission pass upon the exceptions to existing wells and establishing an allowable based on the exception allocations, are you?

A No, I am recommending that they pass on the exceptions now.

Q Isn't it correct that in the event of an exception to a location on this drilling program that there may be cases where there likewise must be an exemption to the allowable granted.

A That wasn't my recommendation.

Q You recommend that each and every well irrespective of the location in the reservoir be given the double allowable?

A Provided the operator files with the Commission a plat showing 80 attributed acres to that well.

Q This is the only basis on which that could be done, isn't it, the recommended proposition here?

A No.

Q You have done it the only way possible.

A No, that recommendation could be changed somewhat. In some areas it possible couldn't.

Q You have some recommended applications on acreage here which doesn't contain either a northwest quarter or southeast quarter?

A That's right.

Q There certainly would have to be some adjustment of allowables where they are off-setting closely drilled wells?
A Those exceptions are due to the present drilling in the field. They were made necessary by the present drilling even though no wells have been started on those two. You are referring to the two locations of the Gulf?
Q No, I am referring to the general exhibit No. 11. All of yourr adjustment, diagonal and eastwest and northsouth adjustment of 80 acres.
A Would you mind repeating the question?
Q My question is simply this, that in the event the Commission were to accept this recommendation on existing wells and on drilling wells, isn't it true that the Commission would probably have to make exceptions in connection with the allowables?
A They would not have to make exceptions in connection with the allowable.
Q Reduce the allowable?
A No, that wasn't our recommendation. We recommended that in order to obtain any allowable and operator must file a plat showing that he has 80 acres behind that well.
Q That is irrespective of the engineering conditions in the field?
A Well, I don't know what you mean by that.
Q In other words, you want to attribute 80 acre allowable to

these geographical locations that you are recommending here irrespective of the reservoir conditions, is that correct?
A No, if the acreage is not, if the acreage that an operator designs to attribute to his well cannot be reasonably presumed productive, then, of course, he would have to take a reduced allowable. It would be expected to.
Q You are speaking now of the interior boundaries of the pool?
A That's right. I don't know that that is involved, however, in this particular arrangement.
Q In connection with the exceptions that you are seeking relative to the southwest quarter of Section 14, what is the basis for that exception in the case of Gulf?
A Well, that was the only way in which I saw that Gulf's acreage could be so arranged as to attribute 80 acres to each well.
Q In other words, you are not recommending an 80 acre fixed pattern spacing program? You are recommending that so long as an operator can attribute 80 acres to his present wells or present drilling wells, he is entitled to an 80 acre allowable.
A For all wells heretofore drilled or now drilling.
Q These 20 wells you referred to?
A That's right. We can't do anything about them, it would be unreasonable to expect to.
Q You stated, I believe, in your direct testimony that you made

a study of the reservoir in the field and all the wells, when was your Phillips well completed?

A On March 31, 1951.

Q Then your information insofar as your own well is concerned your PI tests and so forth are based on two months production experience, is that correct?

A They didn't even have that when we took our P.I. tests.

Q How much time had elapsed between your completion and P.I.?

A We took the P.I. on the day we took the official potential test of the well. We were very rushed to obtain our information, for the date we thought that this hearing was going to be held at that time.

Q In connection with your Exhibit No. 2, the amount of steel required to complete these wells, how does your company allocate its available steel?

A That is not within my province as to how they do that. I don't know.

Q Do you have any - based upon your experience in the oil business do you have any ideas as to how they would?

A Well, I assume that they determine what wells they desire to drill and then allocate the steel to those wells.

Q On a basis of economics?

A Yes, or they might allocate it to wild-cat wells.

Q Is your company now contemplating the construction of a pipe line in west Texas?

A I don't know.

Q Do you know whether they have allocated any steel for that purpose?

A You mean from Berger in the Panhandle? I think not in West Texas.

Q Based upon the cost, estimated cost, of your wells at 275 thousand dollars, what do you estimate your payout period would be in the Devonian and Denton fields?

A That allowable of 295 barrels per day, it would require some 438 days or one and two-tenths years to pay out.

Q Then if wells were drilled on 40 acre pattern with the 295 barrels allowable each well would pay out in a little over one year, is that correct?

A That's right.

Q Referring to your exhibit No. 4, I believe you stated that based upon the bottom hole pressure data and the tests which you have made in that field it is your opinion that one well in that field will drain at least 80 acres, is that correct?

A Yes, sir.

Q Why are you asking for a temporary order?

A Well, it was understood that we were to have some opposition and since the Commission has heretofore issued orders for a temporary period of one year we saw no reason why we should request something different. In view of the fact that before that year is out we feel sure we can come before the Commission

again and present good evidence to get an extention of time.

Q But so far as your company is concerned, you are satisfied that you have sufficient evidence now to obtain a permanent order for 80 acre spacing.

mr. FOSTER: I don't believe there is such a thing as a permanent order for any type of spacing. I believe these are all temporary orders.

MR. SPURRIER: Let the witness answer if he cares to.

MR. FOSTER: I can't see how you can answer as to what the Commission is going to do. I don't see that is the province of the Commission. Of course, he can give his opinion about what you ought to do but as to whether it is really a permanent or temporary order, I don't see how this witness could answer that.

Q (by Mr. Sellinger) There is no particular point in the amendment in amending your application then.

MR. FOSTER: Yes, I think there is a good point in amending the application. We don't think we are infallible and we certainly wouldn't want to be in the position of saying to the Commission that you could write an 80 acre spacing order in the field and never have to look back. I think you ought to take it a little at a time. Look at the whole part as you go along. We are not here advocating that you should just set this thing at 80 acres and say that will be it. I don't know what will develop in a year. We may be in here 12 months from now saying you ought to go to 40. If we

thought the facts justified it, that is what we would be doing. We do know this, that if you continue on 40 acre pattern that you are trying to establish in the field you will never be able to get the 80. You can now start on the 80 and justifiably so in our opinion, and if later on the facts warrant it, you can go from 80 to 40. If you stay with 40 you won't be able to get back to 80.

MR. CAMPBELL: That is exactly our position.

Q Referring to your Exhibit No. 8, which is, I believe the core analysis summary of Denton No. 3.

A That's right.

Q What does that show as to the variation in permeability in the core analysis? Can you refer to that and state what it shows?

A It shows that the horizontal permeability is greater than the vertical permeability.

Q What does it show as to the extent of the variation?

A Well, in one section, the horizontal is 48 millidarcys versus 19 vertical. In another 33 versus 7, that is quite a thin section. In another 34 versus 10.

Q Do you know whether that core analysis showed any completely densed areas in the pay section?

A I think that is true that it did. I don't think you can find a core of any reservoir, any limestone or dolomite reservoir such as this that doesn't have some completely dense section.

Q In other words there is not a continuous and uniform permeability in this reservoir?

A No, I wouldn't say that. I am talking about the core from one well.

Q What is your opinion as to whether there is a continuous or uniform permeability in this reservoir?

A I think it is continuous. It may not be uniform but I think it is continuous.

Q I believe you based yourstatement that the 590 barrels per day allowable would not be wasteful upon the tests taken in your well and Lowe No. 1 Dickinson well.

A Yes, and that is correct and it is partly, also, based on the thought that we have a small section open in our well only one hundred feet of the section out of a total of some 1130 feet per section is open. If we opened up a larger section I am sure we would have a larger productivity index.

Q Do you have any information on the draw down tests in any of the wells in the field that have been producing for a longer period of time in your Phillips well, other than the Lowe?

A No, those are the only two productivity index tests I have been able to obtain.

MR. CAMPBELL: I think that is all.

MR. SPURRIER: Any further questions of this witness?

MR. SCOTT: I am W. A. Scott. If the Commission please,--

MR. SPURRIER: Come forward please.

MR. SCOTT: I would like to ask a few questions.

CROSS EXAMINATION

By MR. SCOTT:

Q Mr. Nicola, did you state or am I correct in saying that you stated that you were asking for exceptions to Gulf locations in Section 14, being the northeast quarter of the southwest quarter and the southwest quarter of the southwest quarter?

A That's correct.

Q Have these locations been established?

A No, they have not.

Q And again, what was the reason for that?

A The reason was that in order to follow the suggested units it was necessary first to establish a diagonal 80 acre unit here consisting of the northeast quarter of the southwest and the southwest quarter of the southwest quarter of 14, and neither of the tracts is a prescribed location for a hereafter drilled well. Then, the Gulf pointed out that it would be better in that case to drill the other well that they contemplate in a southwest quarter of the southwest quarter of Section 14 rather than to drill it as a direct west 40 acre offset to the previously mentioned well. That is the reason that we suggested or requested that those exceptions be granted.

MR. SCOTT: Thank you.

MR. CAMPBELL: Have you made an effort to obtain--how many exceptions would be required from a fixed basing

pattern.

A No, but I can count them. Would you like me to do it?

Q I would like to know. There would be two in Section 35.

A I count 12.

Q 12 exceptions?

A Yes.

Q Out of the 20 drilled wells or locations?

A Out of the 20 drilled wells.

Q Or drilling?

A And, however, that is 12 out of possibly 42 wells that may be drilled in the field.

Q How do you--

A (Interrupting) Pardon me. Those are 12 wells now drilling their locations in addition to the two Gulf locations, that makes 14, or approximately one-third of the 42.

MR. CAMPBELL: That is all.

MR. McCORMICK: Have you made a study of the other Devonian pools in New Mexico?

A No, I have not.

Q You don't have any basis to compare this Denton with the other Devonian pools?

A No, we have a geological witness here, I think perhaps he could do that.

MR. MCCORMICK: That is all.

MR. CAMPBELL: One more question.

Q (by Mr. Campbell) In connection with this recommended

pattern have you made any effort to determine whether or not the lease ownership and mineral ownerwhip under these units is common?

A No, I have not except wherever it appeared that way on the map, I have tried to follow the common ownership.

Q Let me give an example on a lease ownership situation in the southeast quarter of Section 11, the south half of the southeast quarter is set aside there as a proposed 80 acre proration unit.

A Yes, sir.

Q I believe you will find that the lease ownership in the southwest of the southeast and the southeast of the southeast is not common.

A That's right.

Q What do you propose that the Commission do with reference to the oil that has already been produced in that well?

A I have no recommendation.

Q And is it your recommendation that the cost of that well be allocated between the lease owners, if the leases are set up?

A Yes, I think on some basis. I don't know what it would be.

Q If there is not common ownership of minerals under any of these recommended units is it your recommendation to the Commission that they require the pooling of those mineral interests? Do you know?

MR. FOSTER: He says he doesn't know what the power of the Commission is. I don't either.

MR. CAMPBELL: We don't either. I think that is all.

REDIRECT EXAMINATION

By MR. FOSTER:

Q There is one question I would like to ask you about the exceptions. It is true the longer that you put off the 80 acre spacing, the more exceptions you are going to have to have?

A Yes.

Q If you put it off long enough, the exceptions will become the rule?

A That's right.

MR. FOSTER: That is all.

MR. CAMPBELL: Don't you think that has already happened in that field?

A No. I think that you have a lot of exceptions but I think the end that we are attempting to reach here justifies some effort to get there.

MR. CAMPBELL: That is all.

MR. FOSTER: That is all.

MR. R.S. BLYMN: Just for the record, you made a statement that when you observed that bottom hole pressure in your No. 1 pressure that the pressure was off approximately 100 pounds from what you deemed to be virgin pressure for

that reservoir?

A That's correct.

Q You attributed that to some drainage from offset wells or from other wells in the reservoir?

A Yes.

Q Do you have any information on what the pull down pressure of any of these wells are that had pulled your No. 1 Denton down one hundred pounds? The point I am trying to make is that one hundred pounds of draw down in a reservoir, the order of the Denton, is a tremendous draw down if you took it on out of the well itself and took two or three years to do it. And, you have stated here for this record that you think that your well had been pulled down one hundred pounds by other wells in that reservoir. Do you want that in the record?

A I think I said approximately. The observing drop may partly be due to errors in, not errors, but the limits of measurements.

Q I think that is very, very possibly where your whole hundred pounds comes from in my opinion.

A I think you are correct about that.

Q Well, that was just for the record.

A That is what we observed. I don't know what actually might have happened but since we observed such a large pressure draw down, we assumed that that well had been effected by other wells and--

Q (Interrupting) But not one hundred pounds, you don't think?

A In view of the condition it may be some kind of porous channels running between the wells and our well, I don't know, is more porous perhaps and more convenient channel for communication than toward some other well. But in our opinion, obviously, some influence, something had influenced that pressure to be that low in our Denton well, initially.

Q Couldn't be you got two reservoirs there could it?

A No, I don't think so.

MR. BLYMN: That is all.

MR. SPURRIER: Are there any further questions of this witness? If not, the witness may be excused.

(Witness excused.)

MR. SPURRIER: Mr. Foster, in view of the time, I think we will recess until one-fifteen before you start with this witness.

(Noon Recess.)

MR. SPURRIER: The meeting will come to order. Mr. Foster will you proceed? Mr. Smith, please come around and take the witness chair and bring those logs with you.

STANLEY SMITH

HAVing been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR.-FOSTER:

Q Will you state your name please?

A Stanley L. Smith.

Q Where do you live, Mr. Smith?

A Roswell, New Mexico.

Q By whom are you employed?

A Atlantic Refining Company.

Q In what capacity?

A As District Geologist for New Mexico.

Q Have you testified here before the Commission before in New Mexico?

A I have not.

Q Will you state what your educational qualifications as a geologist are?

A I received a bachelor of arts from the University of Colorado in 1941. My major was geology with a minor in minerology. Since that time I have been employed as a geologist by the Atlantic Refining Company.

Q Have you had any occasion in the course of your employment to make a study here of the field that we have under question? The Devonian pool?

A I have.

Q I ask you if you have some well logs that you have collected from the various producers in the field?

A Yes, I have. Exhibit No. 12 is purely a statistical

exhibit showing wells drilled, locations where they were completed and so forth. It also lists the wells now drilling.

Exhibits 13, 14, 15, 16 and 17 and 18 are Schlumberger electrical logs run in the wells in the pools. Copies of these logs were used on the cross section.

Number 19 is a lane wells radio activity log on the Ohio Denton No. 1 well. These logs have marked up on them the drill stem test taken, the tops of the formations and the completion interval and data.

Q Have you prepared some other exhibits for us as evidence in this hearing, Mr. Smith?

A I have.

Q I wish you would go to those exhibits and take them up in whatever order you desire and without too much questioning from me, just explain to the Commission what they are and what they reflect and what conclusions or deductions you draw from them.

A Exhibit No. 20 is a northsouth cross section of electrical logs from the southeastern end of the pool to the northeastern end of the pool. The lines denote corellative horizons. This line is the top of the Wolfcamp formation of the lower permia. This is a uniformity, is the top of the Mississippi. The lower most line here is the top of the Siluro Devonian. The highest well on the Siluro Devonian is the Ohio Denton No. 3. To date the lowest is the Ralph Lowe No. 1. These wells are in the process of completion. The Atlantic State No. 13

and the Skelly Mexico 1F. This section shows that we have a north dip extending from the Ohio Denton No. 3 as far north as the Ralph Lowe No. 1. The pay section ofthe Siluro Devonian is from here to here (indicating) in the Phillips Denton No. 1. Approximately 1100 feet of section altogether within the pay zone.

This exhibit No. 21 is a structural contour map on top of a Siluro Devonian formation. Colored in red on the map are those wells producing from the Devonian; colored in green are those producing from the Wolfcamp, the blue is the well that did produce from the Mississippi. You will note that our eastwest control is not plentiful. The wells drilled to date are in this band here (indicating.) It could be described as the northsouth elongated anticlinal with a dip closure in excess of 1700 feet. I think that about takes care of the structure correlative phase.

Lithologically, the Siluro Devonian can be described as a crystal dolomite varying from fine crystaline to corydaline crystaline in which there is intergranular and vugglar fracture porosity. To date we have approximately 1673 feet of oil column in the hight point in the No. 3 to where the Skelly State 1F recovered water on the drill stem basis.

Q Now, from your study, have you found any conditions here that would indicate that 80 acre spacing could not be safely adopted in this field?

A In my opinion, no.

Q Have you found any indications here that would warrant the conclusion that the Commission would be justified in adopting 80 acre spacing?

A I think it would.

Q Is it your opinion that the Commission and your recommendation that 80 acre spacing should be adopted in this field?

A Yes, it is.

MR. FOSTER: I believe that is all.

CROSS EXAMINATION

By MR. CAMPBELL:

Q Referring to your Exhibit 21, your contour on top of the Devonian, what does that reflect inso far as the dip of structure on the east and west flank is concerned?

A The only way you can arrive at a dip, a true dip on the east and west flanks is by interval.

Q What do the intervals reflect then? What dip is there on your contour there from the center of your structure down to your water-oil contact on the west, say? That is about three-quarters of a mile, isn't it?

A On the west here?

Q Yes.

A Roughly, 14hundred feet.

Q 14 hundred feet and isn't that three-quarters of a mile?

A About.

Q Would you consider that to be a sharply dipping structure

or not?

A Probably is.

Q Would you say the same general condition is probably true on the east?

A That is difficult to say.

Q You don't have enough information to base an opinion on that?

A Actually we don't have much information to base a dip either way. Except by using intervals of these two. Neither one of them have been a contributing part.

Q The best estimates that you could make where presently available information is that the structure may dip rather sharply on the flank?

A It may.

Q Considering that situation, I believe, your statement was that you felt that this field could be developed on 80 acre spacing considering that situation, in the light of the possibility of east west acreage being combined as 80 acre proration units, isn't it possible that you may have the allocation of allowables to nonproductive acreage on the east west side of the pool.

A You always come to the edge of the oil field.

Q That is quite true on 10 acre or any other spacing. Wouldn't it be more pronounced the wider your proration unit was?

A Possibly. However, if you have enough data, you can arrive at the limits fairly accurate.

Q You don't have the data at this time?

A Today we don't have it.

Q Isn't it true that in order to obtain the data, you have to drill wells at or near the edge of the pool?

A The only way you can drill it is to drill wells.

Q Isn't it possible if you have 80 acre spacing where it is necessary to jump over a 40 acre tract and drill your outside location in the field that you might be reluctant to do that where if you were drilling on 40 acres you might more readily define the exterior limits of the pool?

A If you will notice, if you have a producing well here--

Q (Interrupting) What well is that, Mr. Foster?

A Any well. Say you have a producing well in this acre would you have any more risk moving down here than moving down here on the 40.

Q That is probably true. But we are assuming a fixed spacing pattern outside of the presently situated wells in the field.

A Actually along the edge roughly, the north south strip you would be taking no more risk drilling here than you would here (indicating).

MR. SPURRIER: Mr. Smith, you will have to define for the purpose of the record, the area you are talking about because here it doesn't mean anything in the record.

A This is purely an illustration. If you drill in the--say,

section 10, if you drill in the center of the southeast quarter and the southwest quarter and get an oil well, then you are required to drill an 80 acre offset in the northwest quarter of the southwest quarter you would be moving away from the structure the same distance approximately if you were drilling a direct 80 acre offset.

Q Mr. Smith, you stated that in your opinion the spacing of wells in this reservoir on an 80 acre pattern could be done with safety to the field. On what productive rate do you base that statement?

A Why, I think at twice the rate now being produced for the 40 acres no harm would result to the reservoir.

Q Would your opinion on that be changed any if it were developed that any particular wells now drilled in the reservoir could not produce at that rate?

A I would sure like to know the details on that well completion with all the pays on them before I answer that question.

MR. SPURRIER: Would you mind coming back to the witness seat please?

Q You also stated that 80 acre spacing in your opinion should be adopted in this field. You base that opinion on the testimony you have given here?

A Yes. That and my experience with similar type production.

Q Where has that experience been?

A In New Mexico.

Q Which field?

A I am thinking comparatively of the other Devonian production in southeastern New Mexico.

Q And you consider that this--

A (Interrupting) I consider that this--

Q (Excuse me.

A (Continuing) I consider that this field is and will be much more productive than any other devonian pool now producing.

Q I think the thickness of the pay section would indicate that but in the other pools isn't it true that they have it fairly well established that they have water drive of sufficient force in those fields which has not been established here?

A In my opinion we will have the water drive established.

Q On what basis do you base that?

A The fact that almost anywhere you drill into the Devonian you get substantial amounts of water.

Q You have no reservoir information here that indicates that do you?

A No. There is no conclusive proof of it here yet.

Q MR. FOSTER: That is all.

MR. SPURRIER: Any one have any further questions of this witness? If not, the witness may be excused.

(Witness excused.)

MR. FOSTER: At this time we would like to offer for the record, Mr. Commissioner, all of the exhibits which we have identified here.

MR. SPURRIER: They will be accepted.

MR. FOSTER: That is our case.

(Discussion off the record.)

MR. SPURRIER: Mr. Campbell, do you have anything more?

MR. CAMPBELL: I have some witnesses. We will need to put up some exhibits.

MR. SPURRIER: Will you need any of these for reference?

MR. CAMPBELL: No. I have copies of the ones I need to refer to. We will need to put up some exhibits here.

(Off the record.)

MR. SPURRIER: Let's have your attention please. I have a telegram here which was addressed to Guy Sheppard and which Mr. Sheppard asked me to read into the record.

"Undersigned royalty owners in area Denton Pool Lea County, wish to go on record as opposing eighty acre spacing. When original leases were executed in this area forty acre drilling was customary and implied. Development to date in this field provided for forty acre spacing and undersigned believe should continue. Eighty acre spacing will force compulsory pooling of royalty owners interests and cause injustice in edge wells. Eighty acre spacing disappointing to royalty owners Sawyer pool and royalty checks decreasing at serious rate Armada Hamilton pool under eighty acre spacing.

Your consideration appreciated. Signed by: J. M. Denton, J. L. Reed, Granville Dickinson, Trustee for Candace Dickinson, Walter E. Dickinson and W. Gordon Dickinson, Bernice Dickinson, Mrs. Johnnie Fort, J. E. Simmons, Jean Simmons Felfe, W. W. Carter, Sylvester P. Hooper, Betty Lou Pope by Fonzo E. Fort, Guardian, Audie Pope, Johnnie Fort Rutherford, Fannie Mae Gardner, Claude A. Fort, Edd Fort."

Mr. Campbell, you may proceed.

MR. CAMPBELL: Will you swear the witness, please?

(Witness sworn.)

MR. McKELLAR: Mr. Chairman.

MR. SPURRIER: Mr. McKellar.

MR. McKELLAR: I would like to put a note in the record for the Commission to consider, that it doesn't state the truth as to the, all the facts.

Number one, the Sawyer's checks, royalty checks, in the Crossroads pool which apparently it referred as being, no Sawyer pools in the state as far as I know are increasing along with production.

Number two, is, there is no implied obligation in any oil and gas lease that I have ever seen signed in the State of New Mexico to operate on 40 acre spacing. You simply obligate yourself to develop your lease in accordance with good production practice.

MR. SPURRIER: Mr. McKellar, your remarks are well taken. However, I believe that perhaps I didn't make this clear. It is a little bit hard to make clear.

Let me read that sentence again.

"Eighty acre spacing disappointing to royalty owners Sawyer pool and royalty checks decreasing at serious rate Amerada Hamilton pool under eighty acre spacing."

MR. McKELLAR: Even so, of course, one of the largest royalty owners in the Crossroads pool which happens to be the Santa Fe Pacific Railway joined in the application. It is not disappointing to them. I simply want to point that a out to the Commission.

MR. SPURRIER: Proceed Mr. Campbell.

M. C. JONES,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. CAMPBELL:

Q State your name please.

A M. C. Jones.

Q Where do you live?

A Magnolia, Arkansas.

Q By whom are you employed?

A McAlester Fuel Company.

Q In what capacity?

A Landman.

Q How long have you been employed by that company?

A Since December 1945.

Q Since that time have you been responsible for land and leasing activities for the company?

A Yes, sir.

Q Are you acquainted with the lease ownership by McAlester Fuel Company and other operators in the Denton pool in Lea County, New Mexico?

A I am.

Q I refer you to the exhibit on the left, marked Exhibit M-1, Case 269, and ask you to state what that is.

A That is a lease ownership map of the Denton pool, Denton area.

Q Are you acquainted with the mineral ownership in the Denton pool?

A Yes, sir, I am.

Q What is the basis of your information as to mineral ownership in that pool?

A The information was compiled by Elliott, Waldren and Strack Company in Lea County, New Mexico.

Q At your request?

A At my request.

Q I refer you to the exhibit second from your left there, marked Exhibit M-2, Case 269, and ask you to state what that is?

A That is a mineral ownership map of the Denton area, Lea County.

Q What are the numbers on the map?

A The numbers designate the tracts owned by the royalty owners

in the area and you will find attached to the plat corresponding with the numbers shown on the plat a list of mineral owners, designated for each tract.

Q I hand you what I have marked as Exhibit A to Exhibit M-1, in Case 269, and ask you if that is the reference that you referred to?

A Yes, sir, it is.

Q Now referring to Exhibit M-1, will you state where the discovery well inthe Denton pool is located?

A Located near the center of the southwest quarter of the southeast quarter of Section 11, Township 15 South, Range 37 east.

Q Referring to Exhibit 11, will you state what the lease ownership is in the 40 acre tract immediately east of the discovery well 40 acre tract?

A Southeast southeast of Section 11 the lease ownership is as follows:

Ohio Oil Company one-half, Atlantic Refining Company one-fourth, McAlester Fuel Company, et.al., one-fourth.

Q In other words, the lease ownerships in those two 40 acre tracts is not the same?

A No, sir, it is not.

Q Referring again to Exhibit M-1, will you state whether or not McAlester Fuel Company owns any isolated 40 acre leases

on that?

A They do. They own the southeast quarter of the northeast quarter of Section 2, Township 15 South, Range 37 East. It is owned by the minerals, the lease was purchased from the State of New Mexico.

Q In other words, that is a State lease,40 acre tract in the state lease which you own?

A That's right.

Q Referring again to Exhibit 11, what is the recommended procedure in connection with an 80 acre proration unit in so far as the 40 acre state lease is concerned?

A It is recommended under this Exhibit 11 that our state lease description of which was just given be unitized with the east 40 which would be the southwest quarter of the northwest quarter of Section 1.

Q And so far as you know, that is owned in fee?

A Yes, sir, it is.

Q Then in the event that 80 acre proration units were established in this pool referd to that isolated 40 acre tract and to your 40 acres upon which the discovery well was drilled, if these recommendations were to be adopted by the Commission, it would be necessary to pool the lease-owned interests, is that correct?

A That's correct.

Q Referring to Exhibit M-2, can you state whether--and referring to Exhibit 11--

MR. FOSTER: That is Phillip's Exhibit No. 11.

Q Phillips Exhibit 11, the suggested pattern for units where wells are already drilled, can you state whether mineral ownership under these proposed units is common?

A It is not.

Q In what instances is the mineral ownership there?

A It is suggested on Phillips Exhibit 11 that the southwest quarter of the northeast quarter of Section 14 and the northeast quarter of the southeast quarter of Section 14, comprise one 80 acre unit. The royalty ownership under the southwest quarter of the northeast quarter of 14 is different from the northeast quarter of the southeast quarter of 14. By the same token, the southeast quarter of the southwest quarter and the west half of the southwest quarter of the southeast quarter of Section 14 has a different royalty ownership than the east half of the southwest quarter of the southeast quarter of 14. That 60 acre tract and the 80 acre tract they propose to comprise one unit.

Q Does McAlester Fuel Company own some lease owned interest in some of the areas you have referred to?

A Yes, sir, they do.

Q In the event this suggested pattern on existing wells and drilling wells were adopted, it would be necessary to pool royalty interests to create those proration units, is that correct?

A It would, yes.

MR. CAMPBELL: That is all.

MR. SPURRIER: Do you care to cross examine?

MR. FOSTER: I want to ask just one or two questions.

CROSS EXAMINATION

By MR. FOSTER:

Q This diversity of ownership you have pointed out of these various tracts, do you think that that offers any valid objections to 80 acre spacing?

A It would necessitate the unitization by the royalty owners in order to form one 80 acre unit. That would be the matter for the Commission.

Q Would that be any valid objection to adopting a correct spacing pattern?

A If the Commission has the power to unitize those tracts, no, sir.

MR. FOSTER: That is all.

REDIRECT EXAMINATION

By MR. CAMPBELL:

Q In connection with the pooling of lease holders interests that situation that there are property rights involved are there not?

A That's right. Under the south half of the southeast quarter of Section 11, Township 15 south, Range 37 East, McAlester Fuel Company has been operating a Devonian well on the southwest southeast since October 1949, and the lease ownership under the southeast quarter of the southeast quarter of Section 11 is different.

Q The result then would be that you would be taking on some new partners, is that correct?

A That's correct.

MR. CAMPBELL: That is all.

RECROSS EXAMINATION

By MR. FOSTER:

Q Do you think that is a valid objection to adopting a correct spacing pattern?

A I would say it would be extremely difficult to work out some acceptable formula both in back production and in material on the ground.

Q Well, but you wouldn't, if 80 acre spacing should be adopted, that wouldn't, the fact that you would have difficulty in working out somebody's property wouldn't cause you to condemn it, would it?

A I can't answer that, that being out of my catagory.

Q Then what is the purpose of your calling our attention to the diversity of ownership?

MR. CAMPBELL: I don't see any point in arguing with the witness. I tell you the point. The Commission is entitled to know what ultimate results and problems may be faced in the event that the first step in 80 acre units is taken.

MR. FOSTER: I think you always have diversity in ownership in any field. You have that problem anyway. I wonder if you were advancing that as a valid reason why the 80 acre spacing should not be adopted.

MR. CAMPBELL: In this field it is correct.

MR. FOSTER: If it is true in this field it would be in others.

MR. CAMPBELL: This field has been developed on 40 acre pattern at this time. This is hardly the time for argument.

MR. SPURRIER: Any further questions of this witness? If not, the witness may be excused.

(Witness excused.)

KEM E. MERREN,

having been first duly sworn, testified as follows.

DIRECT EXAMINATION

By MR. CAMPBELL:

Q State your name please.

A Kem E. Merren.

Q Where do you live?

A Magnolia, Arkansas.

Q By whom are you employed?

A McAlester Fuel Company.

Q For how long?

A Three and a half years.

Q What capacity?

A As Petroleum geologist.

Q In connection with your duties of that company, have you made a study of the geology of the Denton Pool in Lea County, New Mexico?

A I have.

Q I refer you to the map, the third from your left, which is marked Exhibit M-3, in Case No. 269, and ask you to state what that is?

A That map is a structural map on the top of the Devonian formation and the dash lines are where we do not have positive control, the solid lines are where we do have control, the wells circled in red are those that have penetrated the Devonian or scheduled to go to the Devonian.

Q Was that prepared in your geology department?

A It was.

Q Did you assist in the preparation?

A I did.

Q In your opinion is that, from the available information, is that a reasonable interpretation of the structure on the top of the Devonian?

A It is.

Q Would you come over to the exhibit here and explain the nature of the structure on your interpretation?

A Well, the general nature of the structure is a generally north south anticlinal with what we think is a very steep dip on the flank. Using the interval, the top of the Devonian on our discovery well, McAlester No. 1 Denton to our point on the water of the northeast northeast of Section 15, shows a dip of 1644 feet. That figures at a rate of 2140 feet combined.

Using the interval on the top of the Devonian in McAlester's Denton A-1 to the estimated top to the Atlantic A-1, northwest northwest of Section 13, that is a dip of 1,044 feet and figures at a rate of 1900 feet.

Q Have you examined Phillips Exhibit 21, which is a contour map of their interpretation of the contour of the top of the Devonian in that field?

A I have.

Q Is there any essential difference in the general geological interpretation between the two exhibits?

A No.

Q In both cases you have used the estimated points in Section 13 and 15 for your information on the flank of the structure, is that correct?

A That's correct.

Q Referring to your contour map, do you have any opinion as to what the possible effect could be of proration units of 80 acres extending east and west in that field?

A Yes, I do. I believe that in that case where you have an 80 acre unit running east and west it would be possible for one party to be productive and the other party to be dry.

Q Have you had experience in that respect in moving out of the flank of that structure?

A Yes, we have. We drilled our McAlester A-1 in northeast northeast of Section 15 and got the only dry hole in the field and we have had ample evidence of the steep dip.

Q How far is that from the nearest inside production?

A Well, it is approximately three-quarters of a mile.

Q That is from the Gulf well in the northeast of the northwest ofSection 14?

A That's right. From the Gulf Chamberlain No. 1.

Q Now, referring to Phillips Exhibit 11, in that area where your dry hole was drilled in Section 14, and referring to the suggested pattern for existing wells, can you state whether the Gulf well referred to will be the only well situated inthe 160 acres in the northeast northwest quarter of Section 14?

A Well, I believe that according to the way of our structure that that well will be the only well in that quarter that would be productive in the Devonian with that 80 acre unit running east and west.

Q The way the units are set up now the well in the northwest of the northeast of 14 would come over and refer to this in the northwest of the northeast of 14 is combined with the 40 in the southeast of the northwest. A well is already drilled on that unit. The completion by the applicant in connection with the Gulf wells in the southwest quarter would put the well for that unit in the southwest quarter of Section 14 so the only well in the northwest quarter would be the Gulf well?

A That's correct.

Q I now refer you to what has been marked Exhibit M-4, Case 269, and ask you to state what that is?

A Well, this Exhibit M-4, is a micro-log cross section on the top of the Devonian and the Devonian is the only formation shown there on the cross section.

Q Let's get the other. Do you have the core analysis? I also refer you here to Phillips No. 8, in Case No. 269, which is the core summary of the Ohio Denton No. 3 using the information on the summary of the Ohio Denton No. 3, the micro-log cross section and the core analysis of that well, state what conclusions you were able to draw as to the porosity and permeability in this pool.

A We have reached the conclusion that the core analysis and drill stem tests are more in agreement with those two together than in any combination of micro-log. I would like to cite some examples on the core analysis of the wide variation in permeability. Through two intervals in the Ohio Denton No. 3, the first interval is 11554 to 11603 and in that interval the permeability ranges from one millidarcys to a maximum of 600 millidarcys and porosity varies from two and seven-tenths per cent to ten per cent. Now, on the micro-log on the Ohio Denton No. 3, through this same interval it shows good continuous permeability throughout. The second interval is 11,790 to 11,860, the core and all the permeable ranges from less than one millidarcy to a maximum of fifty millidarcys porosity varies from two and eight-tenths per cent to six and eight-tenths per cent and larger percentage of the interval shows low values. On the micro-log again,

this interval shows that 80 per cent had good continuous permeability. On the core analysis there are five different terms used to describe the cores and various combinations of those terms they are densed, fractured, porous, vugglar, and styolitic .

Now, I have three examples of it. Demonstrating the ragged nature of the permeability in the producing formation. I will point those out on the micro-log cross section. The first one is the comparison of the micro-logs for the Ohio No. 3 and Phillips Denton No. 1. Through these two zones where approximately four hundred fifty feet of continuous permeability is shown on Phillips Denton No. 1, there is a coring zone in the Ohio Denton No. 3 where considerably less permeability is shown. We feel that that is a good illustration of the erratic nature of the permeability. As shown by the micro-log.

No. 2 is a comparison df the first and third drill stem tests for Phillips Denton No. 1. The first drill stem test is in the upper section where the micro-log shows very little permeability. On that test the well flowed at the rate of three barrels an hour. The third drill stem test which is right here through this section showing good solid permeability, the well flowed at the rate of 27 barrels for the first hour and 32 for the second. There are two zones there; comparing this one has hard permeability; this one has good continuous permeability and yet there is very little difference in the flowing rate of the wells.

Number 3, in comparison with the dfirst drill stem test, McClure A-1, right here, and the first drill stem test of the Phillips Denton No. 1, right here, both of those tests on the upper most part of the Devonian, and I would like to add that there is only about 50 feet difference between the subsea top in the Devonian of those two wells. On the McAlester McClure A-1, on the three hour test, the recovery was 270 of oil and gas and 1500 feet of oil and gas through this section right here. On the Phillips Denton No. 1, referring to the same drill stem test again, in two hours and 20 minutes, the well flowed at the rate of 31 barrels an hour.

Going back to the McAlester A-1, the shut-in pressure was 1660 on this test; on the first test on the Phillips well was 4950. Again showing a very wide variation.

We feel that there are other examples but that these three give ample evidence of the erratic nature of the producing formation.

MR. CAMPBELL: That is all.

CROSS EXAMINATION

By MR. FOSTER:

Q Mr. Merren, taking that well on the east flank there, on Exhibit--I can't tell what that exhibit is.

A That is Exhibit M-3.

Q On the west flank of the structure there, you testified

about that well, I want to ask you, was that well completed in the Devonian?

A No, that well never reached the Devonian.

Q What happened to it?

A It was plugged and abandoned at a total depth of twelve thousand fifteen feet--

Q Your testimony indicated that it marked the outer limits of the field there as to the outer limits of the Devonian pool. A That is my opinion.

Q How can you say that when it never got down.

A We went to a total depth of twelve thousand fifteen at which point we felt we never penetrated the Mississippian which was top at ten four nine five, we went at twelve thousand fifteen feet that section 11,410 to--drilled at an average rate of six and seven minus per foot. We had continued loss of circulation all through that zone and we had nothing to indicate that we had ever penetrated the Mississippian.

Q Of course, you know that you got to reach the edge of an oil field sometime, don't you?

A Yes.

Q If there is some acreage on the edge of the field there that is not productive and there is no indication it is productive, well, of course, that just wouldn't be allocated to a well would it?

A No, I don't believe that it would.

Q Doesn't indicate that you shouldn't have 80 acre spacing does it?

A Well, the purpose of this map is to show the steep dip on the top of the Devonian and it is possible there in the northwest quarter of Section 14 to have 1100 feet of depth to one 60. On 40 acre spacing you would have only five hundred fifty feet of depth.

Q Are you of the opinion that one well wouldn't adequately drain 80 acres in this field.

A I am.

Q That is based on present information that you have?

A Yes, sir.

Q If you wanted to go to 80 acres you had better start with 80 acres, hadn't you, in any pool?

A I believe that would be correct.

Q You can't get back to 80 acre spacing when you start with 40 very well, can you?

A No, sir.

Q But you can go from 80 to 40?

A That would be possible.

Q It is possible that later information here may indicate that you ought to have 80 acre spacing even to your company, isn't that possible?

A That may be possible, but as of now, we are not of that opinion.

Q I understand that. Are you just constitutionally opposed to 80 acre spacing?

A No, sir, I am not. I do not believe that in this reservoir that one well to 80 acres will adequately drain the reservoir.

Q You don't believe there is any question about that?

A That is my opinion.

Q Yes. You don't believe you could be wrong about that?

A I could be wrong, but that is my opinion as of now.

Q You mentioned up there where you found very little difference in the flow rate in a couple of the wells there that you called our attention to. How do you account for that?

A Well, I was using that example to demonstrate that the micro-log was not necessarily giving us a true picture of those sections. That in the upper section the micro-log showed very little permeability, the lower section it showed good continuous permeability and the result of the drill stem tests were nearly identical.

Q There is quite a bit of fractures through there, too?

A In some places.

Q That would have something to do with the area which one well would drain, would it not?

A Yes, sir, it certainly would.

Q In most of these fields you found relatively speaking, at least wide variations in permeability and porosity throughout the field, did you not?

A I believe that is correct.

Q That is just characteristic of fields generally, isn't it?

A Well, there seems to be more of a variation here than any I have known of.

Q Well, now when you say more, that doesn't mean very much to me. All these things are relative and--but in all of these fields you found a wide variation in permeability and porosity. I never heard of one where that wasn't so, have you?

A I believe that I have heard of fields where there was not as much variation as we have here.

Q In comparing fields. But in all fields there is a wide variation in permeability and porosity. That is true in every oil field or pool.

A Not necessarily.

Q And you wouldn't comdemn wider spacing on just that fact alone would you, because there is some variation in the field of permeability and porosity?

A If I thought there was enough variation to prevent one well in an 80 acre spacing from adequately draining a reservoir, that would be my opinion.

Q You think you find enough variation here to justify that conclusion?

A I think I have.

MR. FOSTER: That is all.

MR. CAMPBELL: That is all.

MR. SPURRIER: Anyone have any further questions of this witness? If not, the witness is excused.

(Witness excused.)

VERNON TURNER,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. CAMPBELL:

Q State your name please.

A Vernon Turner.

Q Where do you live?

A Magnolia, Arkansas.

Q By whom are you employed?

A McAlester Fuel Company.

Q How long have you worked for them?

A Three and a half years.

Q In what capacity?

A Chief Engineer.

Q Are you acquainted as engineer for the company with the Denton oil pool in Lea County, New Mexico?

A Yes, sir, I am.

Q You were acquainted with the operations which resulted in discovery well in that pool?

A That's right.

Q Since the discovery well, when was that discovery well completed?

A In October of 1949.

Q Approximately 18 months ago.

A Roughly 18 months.

Q What has been the spacing program generally followed in this field to this time?

A Well, to date all the wells have been drilled on a 40 acre spacing pattern. I believe that has been brought out in previous testimony, that on the south end of the field there is a cluster of 40 acre locations and also on the north end of the field.

Q Is it correct that four Devonian wells have been completed and a fifth is now drilling, which are 40 acre step outs from the discovery well?

A That's right.

Q In other words, the field is in a position now where there are clusters of 40 acre wells, is that right?

A Yes, sir, definitely.

Q From an engineering point of view, what in your opinion might be the result of changing at this time the pattern to an 80 acre wider space pattern?

A Well, it would certainly leave a lot to be desired as far as the drainage pattern is concerned if an effort should be made to change to an 80 acre pattern. It would be necessary to include a number of diagonal offsetting 40 acre tracts. As Mr. Merren has testified, we have ample evidence

of the steeply dipping nature of the Devonian information and it is our concern under the applicants proposed procedure that considerable dry acreage would be included with producing units for which it would be granted allowable for which there is no justification.

Q Are you familiar with the core analysis in the Ohio Denton No. 3 well?

A Yes, sir.

Q Have you studied that core analysis?

A Yes.

Q Are you acquainted with the micro-log?

A That's right.

Q Based upon those, what is your opinion as to the range of permeability, or average permeability, in this field?

A The core analysis data from Ohio Denton No. 3, the interval cored from 11,125 feet to 12,103 feet, or a total of 970 feet of section, the over all recovery was 96.5 per cent. The porosity range maximum of ten per cent to a minimum of four-tenths of one per cent. The average was 3.6 per cent. That average was obtained from five hundred sixty-five samples and listed.

Q What is the situation as to permeability?

A The maximum permeability recorded on the core graph was 1,020 millidarcys. The mimimum permeability was one-tenth of one millidarcy. The average horizontal permeability was 33.3 millidarcys and at 90 degrees, ten point eight millidarcys.

Q In your opinion are those variations indicative of an erratic formation?

A Yes, sir, it is.

Q Based on your experience in other areas in which you operate would you say that is average or below average or above average in variation?

A In our opinion, those values are rather low at least in our areas of operation.

Q Permeability in itself is low?

A Yes, sir.

Q With regard to the variations from the high to the low permeable area?

A I would say that the variation is greater in this particular field than in the fields in which we operate.

Q What is the effect of that condition on reservoir drainage and spacing in your opinion?

A Well, we think that possibly, might say probably, there are a number of those zones that constitute essentially a closed system due to low permeability. We do not feel that one well to 80 acres will adequately develop such a section of that nature.

Q I hand you what has been marked Exhibit M-5, Case No. 269, and ask you to state what that is?

A This is a productive measurement on the three wells in the Denton Field.

Q Referring to that exhibit and pointing out which wells are included, state what it reflects as to producing capacity of the wells shown on it.

A Well, in addition to the draw down tests that are already submitted, we have two other wells on which we have draw down tests data. The Phillip's draw down tests have already been submitted, so I won't go into that. Gulf Chamberlain No. 1 located in the northwest northeast quarter of Section 14, draw down test was run on March the first, 1950, with 18 feet of pay exposed following a 24 hour period of operation producing at the rate of 337 point-- 338.5 barrels per day, a bottom hole pressure of 4,304 pounds was recorded. That represented at that rate a draw down of 577 pounds over static conditions, with an indicated P. I. of .58665.

Q What was the situation on the McAlester well?

A The McAlester Denton A-1, draw down tests were run on that well, the first part of the month. The draw downs were run at four different rates of production, but I will only use the minimum and maximum rates. On May 3, 1951, at 130 feet of pay exposed a shut-in bottom hole pressure of 4,726 pounds was recorded at 11,290 feet. The following day, the well was opened up on a two hundred twenty-nine barrels per day rate, the bottom hole pressure of 4,208 pounds per square inch was recorded. Gave a draw down over static conditions of 518 pounds, with an indicated P. I. of .518.

Then, going to the highest rate of withdrawal on May 7, 1951, and producing at the rate of 679 barrels per day, bottom hole pressure of2105 pounds was recorded. At the same depth.

That represented a draw down of 2575 pounds over static conditions, with indicated P. I. of .264.

Q Considering your own well there, what is the effect of that draw down at that high rate on the capacity of the well to produce and the effect on the reservoir?

A Well, I would seriously question the effect on the reservoir producing that well at that rate over a long period.

Q Would it tend to create an artificial gas cap in your opinion?

A I am afraid it would. The saturation pressure for the crude is 2665 pounds, the flowing bottom hole pressure at that high rate is 2151 pounds or--

Q Based on you tests there, assuming a production of five hundred and ninety barrels a day, is it true that you would be approaching a saturation on your well?

A I am afraid you would.

Q What is the effect of that?

A Well, you would create a low pressure area adjacent to that well. Solution gas would be released and you would create an artificial gas cap and dissipate the reservoir energy

that is availbale.

Q In other words, based on your production experience of your discovery well and the test you made, you feel that caution should be exercised in increasing the allowable?

A I certainly do. I think I would be opposed to any increase in the allowable above the present rate or something slightly above that.

Q Based upon your experience in this field and your knowledge of this reservoir and the production history of your wells, is it your opinion that the reservoir will be more efficiently drained by the uniform pattern of 40 acre spacing on the state wide pattern than by the proposal of the applicant here?

A Yes, sir, I do. You have already a cluster of 40 acre locations and if those wells are granted the high allowable as has been requested, you are going to recreate a low pressure area in that part of the field.

Q To your knowledge is your company prepared to develop the acreage in this field upon a 40 acre bases?

A Yes, sir, we are.

MR. CAMPBELL: That is all.

CROSS EXAMINATION

By MR. FOSTER:

Q You only have one core analysis for the whole field?

A That's right.

Q You don't know what a core analysis from other wells might indicate with respect to permeability or porosity?

A As far as I know there have been no other cores taken.

Q That is what I am saying.

A Yes.

Q As far as I know there has only been one taken. That is one out of how many wells in the field.

A Six completed so far.

Q Six completed. So far based on that one core analysis you would be willing to condemn 80 acre spacing?

A On the basis of the information which we now have available.

Q I understand that.

A The fact that you only have one core analysis available I don't think you would just discard it as not being of any benefit. We have nothing further to go on.

Q Would you accept it as being representative of the entire field?

A Until we have more representative information, I have no alternative but to accept it.

Q From this one core analysis you just assume that the same permeability and same porosity would be reflected if you had core analysis from all the other wells?

A I think, Mr. Merren's testimony that he presented is ample evidence of the erratic nature of the formation.

MR. FOSTER: I believe that is all.

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

MR. BLYMN: Yes, I do.

Q (by Mr. Blymn) Mr. Turner, I believe you testified that in order for your Denton No. 1 to produce at the rate of approximately 600 barrels a day, it was necessary through a differential on that well of approximately one-half of static, was that correct? You had to draw that well down about 2500 pounds to produce?

A Almost 2600 pounds.

Q You stated that order of draw down was conducive to breaking solution gas out in the formation of gas cap, is it also conducive to coning of water?

A I think it would be.

Q Would you consider that possible coning an edge water cone or a bottom water cone?

A Well, I believe it would be an edge water cone. Probably along zones of high permeability.

Q In the event that coning was seriously aggravated what effect would that tend to have upon the production of those wells?

A Well, it would result in by-passing of oil in places which would never be recovered I am afraid.

MR. BLYMN: That is all.

MR. SPURRIER: Anyone have a further question?

MR. CAMPBELL: THat is all.

MR. FOSTER: That is all.

MR. SPURRIER: The witness may be excused.

(Witness excused.)

MR. FOSTER: I don't know that it is necessary to make any particular argument here in this case. I don't see what an argument would add to it. The facts are those that anybody can draw their conclusion.

I think the record supports the contention that if you choose to do so you would be supported on the record in adopting the 80 acre spacing here, if you want to adopt it.

MR. CAMPBELL: I don't want to argue the thing. I do want to be certain that the record makes clear the position of McAlester Fuel Company in this matter.

The principal concern of that company is that the development of the field to date and the present development in drillingin their opinion 80 acre spacing either on a fixed pattern basis or on an alternate 40 acre basis is going to adversely effect the correlative rights of the lease owners and the reservoir itself. As pointed out in the testimony, you have clusters of 40 acre wells in one place, in the northwest quarter of Section 14. The result of the recommended pattern of the applicant would have one well in 160 acres situated in the northeast quarter in the northeast 40 of the 160 acre quarter section.

It seems to us it is quite apparent that the situation

here will be that there is no uniformity rather than any uniform 80 acre spacing pattern.

It appears further to us that in view of the number of wells that have been drilled and are drilling that the only way you can get to the northwest southeast pattern is to get off the structure. We don't feel that is a proper way to develop a field or to properly drain the reservoir. I also, want to make one brief comment about the shortage of steel.

As I said, we are all concerned about that. But the testimony has shown that there is 1700 feet of pay in this Denton pool, if these wells are drilled on 80 acre spacing with 590 barrels allowable would take the position that they had much left in reserve. If steel is so utilized for national defense, it occurs to us that there could be no better place to put it than in a field with this kind of a pay section and produce the wells at half the rate and leave available some productive capacity in the event of a national emergency.

MR. SMITH: I would like to correct that statement about 1700 feet of pay. There is 1673 feet of oil column. The amount of pay varies somewhat from well to well. There being a maximum thickness of Siluro Devonian in one well of about 1100 feet which is pay.

MR. CAMPBELL: I appreciate the correction. I think it is obvious that it is an excellent reservoir from the point of view of pay section.

MR. FOSTER: The 160 acres is the northwest quarter rather than the northeast where there is one proposed well.

MR. CAMPBELL: It is in the northeast quarter of the northwest quarter of Section 14.

MR. SPURRIER: Does anyone have anything further in this case?

MR. PAUL COLLISTON: Continental Oil Company wishes to go on record in support of 80 acre spacing in New Mexico where reservoir characteristics and economics justify that spacing; however, since all allowables in New Mexico are determined on a statewide basis, we respectfully request the Commission to forego the granting of additional allowables to 80 acre deep wells until a statewide policy in this regard has been established. It is our recommendation that a special hearing be called by the Commission to permit all operators in the state to make recommendations toward the adoption of some statewide rule on this matter.

MR. SPURRIER: Anyone have anything else?

MR. SCOTT: I would like to make a statement in behalf of Shell. Insofar as Shell is concerned, we would not object to 80 acre proration of rectangular, but all of the units being within the same section and with operational development on the 40 acre tract on the proration unit until the structure is defined and limits of production established. We are opposed to 80 acre proration which would comprise

diagonal 40 acre tracts included in those shown in plats in Phillip's Exhibit No. 11. Our reasons are as follows. One, such units are contrary to the Commissions policy as laid down in its rules which is for compact units as nearly in the form of a square as possible. Two, unless units are confined to a particular section the problem of unitizing royalties is apt to be particularly difficult. Three, under the proposed plan as set forth on Phillips plat which is Exhibit 11, Section 2 would eventually have one more well than would be the case if it were developed on a rectangular 80 acre pattern. Four, the proposed plan on the Phillip's No. 11 would prevent formation of regular units in both sections, one and three to the east and west of section 2, if and when these sections are developed. At the present time we have no objections to Phillips proposal of the allowable rate of production for the Siluro Devonian reservoir. However, we do feel that the matter should be reviewed at the end of the year and provisions made for adequate engineering data at the end of this period. We would be in opposition to any regulation which would prohibit development of a 40 acre tract in the event this 40 acres could not be included in 80 acre proration unit of rectangular shape within the same section. We have no objection to 80 acre proration units and we are ready and willing to unitize our 40 acre tract in Section 2 with another operator's 40 acres adjoining in the same section so as to form a rectangular 40 acre proration unit.

MR. SPURRIER: Anyone else?

MR. TURNER: I am the owner of mineral interests in the Southeast quarter of Section 14 and north half of Section 23, and the owner of oil payments in Sections 15, 21, 23 28 and 35 in Township 15 South, Range 37 East, and minerals in NE¼, Section 26, 14 South, 37 East, in Lea County, New Mexico and I wish to protest the proposed 80 acre spacing plan in the Dentol Pool, a part of which is in this area. I would like for this protest to be entered as a part of the record in both cases involving the Wolf-Camp and the Devonian formations.

It appears that part of my holdings are definitely at the edge of the presently known boundaries of the field. I have had previous experience on the edge of fields where 80 acre spacing was adopted and I know the results. I own minerals in the Bagley field and in the Knowles field, both of which have been on 80 acre spacing. In each case, as here, I have been unfortunate enough to be on the edge of the pool.

In the Knowles field a well was drilled on the 80 acre pattern and it was dry. The royalty owners finally got the operator to drill on the other 40 acres but if we get a well we will get one-half the allowable allocated to offset wells which are on the 80-acre pattern. In the Bagley field, with a water drive, we will probably have our edge acreage washed out before drilling will be risked by the operator who must jump over one 40 acre tract to maintain the pattern. I have made a mistake by not protesting these previous applications and I do not intend to make the same

mistake again. If oil moves through these reservoirs with the efficiency and the speed which the engineers for the operators indicate I certainly want to preserve my right to 40 acre offsets and 330 foot locations, particularly when my holdings are on the edge of the pool.

I have bought minerals and sold leases in New Mexico for a long time and particularly where the field starts out, as here, on 40 acre spacing, I want it to continue that way. I doubt that all the recoverable oil can be drained from the reservoir without some sort of uniform pattern. I believe that the Commission, representing the citizens of New Mexico should also consider this matter most carefully.

I suppose that if 80 acre proration units were established it would be necessary to pool interests of royalty owners. I would like to say now that I will resist the pooling of any of my interests for 80 acre spacing.

I have heard something said about shortage of pipe. Now I do not know how much pipe is available to the operators in this pool but It would seem to me that whatever is available could not be put to better use than to place it in 1700 feet of pay section.

I protest against 80 acre spacing, temporary or permanent.

MR. SPURRIER: Anyone else?

MR. MOFFATT: I have a statement for Gulf Oil. My

name is Murray C. Moffat with the Gulf Oil Corporation.

Gulf concurs in the recommendation of the Phillips Petroleum Company for 80-acre spacing and proration units in the Denton Pool. We also join in the request for double allowables for wells on 80-acres within the provision that exceptions for the two future locations, Gulf feels, these being in the southwest southwest of the southwest are agreeable to the Commission.

If the Commission is not inclined to grant these exceptions as shown on Phillips 11, it will be necessary for Gulf to support 40-acre spacing in the pool in order to protect our interest and those of our royalty owner.

MR. SPURRIER: Anyone else?

MR. WHITE: I have a statement. My name is Emmett D. White and I am Vice-president of Leonard Oil Company of Roswell, New Mexico.

Leonard Oil Company owns minerals in Sections 3 and 4, Township 15 South, Range 37 East, Lea County, New Mexico. This area is not within the presently defined limits of the Denton Oil pool, but its location on the western edge of the north portion of this pool makes any well spacing program of importance to our company.

We wish to protest the establishment of 80-acre proration units in this pool as requested by Phillips Petroleum Company in Case No. 269 involving the Siluro Devonian zone of

of production and in Case No. 270 involving the Wolfcamp zone of production.

As the Commission knows, and as it has confirmed by its statewide rules and regulations for the purpose of conserving our natural resources, the drilling and proration unit for New Mexico for many years has been 40 acres. Minerals and leases have been bought and sold with this program in mind.

Our objections to the proposed 80-acre spacing in the Denton field are based upon the following:

1. This pool has been developed to date under the statewide rules providing for 40-acre drilling and proration units. There are approximately 20 wells, drilling wells, or locations in the field at present, and with a possible few exceptions, these have been located upon the assumption that the statewide rules would apply. A spacing pattern, we believe, should be as uniform as possible in order to provide maximum efficient use of the reservoir energy. The proposal of the applicant in this case makes such uniformity impossible.

2. The establishment of 80 acre proration units and double allowables would be in our opinion have a serious effect upon the ultimate recovery of oil and would particularly affect the wells on the edge of the pool. It is apparent that the area under which we own an interest may be on the edge of the structure. Production of wells up-structure at an excessive rate would tend to wash out the edge properties prematurely.

3. Under an 80 acre spacing program it is quite possible for a productive 40 acre unit to be forced to share its oil with an adjoining 40 acre unit which may subsequently be proved non-productive. While we recognize that this condition may exist in any spacing program, we feel that the wider the spacing the more aggravated the situation becomes and the more adverse will be the effect upon correlative rights.

4. The establishment of 80 acre proration units, it seems to us, is but the first step to compulsory pooling of interests as it would appear to be wholly impractical to adjust the units in such a manner that royalty ownership under each of the 80 acre tracts would be common. The Commission, we feel, should consider the ultimate effects of the establishment of 80 acre proration units upon the rights of royalty owners who have acquired their property upon the reasonable assumption that statewide 40 acre spacing rules would apply. We are inclined to consider the long-standing practice of 40 acre spacing in New Mexico as approaching the nature of an implied covenant in our leases.

5. The Denton pool appears to be one of the most potentially prolific oil pools discovered to date in New Mexico. It seems to us that from the point of view of national defense and the proper use of critical materials that there could be not better place to drill than in such a pool. One well on an 80 acre proration unit produced at twice the rate of a 40 acre spaced well has little to offer in the event of any emergency. Two

wells upon an 80 acre tract produced at half the rate offer possibilities of increased production in the event of a national emergency. There is little doubt as to the economics of the matter since these wells will pay out within a relatively short time, and we believe that this field offers a profitable place for the investment of money and critical materials.

We respectfully submit our views to the Commision as royalty owners in the Denton area.

MR. SPURRIER: Anyone else.

MR. HOWARD: I have a statement for the Atlantic. My name is R. E. Howard. The Atlantic Refining Company wishes to concur with Phillips Petroleum Company in their request for 80-acre spacing with the well to be located on alternate 40-acre tracts, in the center of the northwest and southeast quarter of each quarter section, and also the request for a double 40-acre allowable with deep well adaptation. We also join in their request that this be based on a temporary order.

MR. SPURRIER; Anyone else?

MRS. CLAYTON: I have a statement I would like to give. My name is Mary D. Clayton from Lovington.

I am one of three trustees of a portion of the Dickinson Estate. We hold in trust for certain of the heirs a considerable amount of property, including mineral interests in Lea County, New Mexico. This property includes approximately 3800 mineral acres in Townships 14 and 15 South, Range 37 and 38 East, much of which immediately surrounds the presently developed

area in the Denton oil field. I also individually own approximately 1100 mineral acres lying to the South of this presently developed Denton area. I wish to enter a protest against the application in this case for myself individually and on behalf of the other trustees of the trust estate.

As we understand the application of Phillips Petroleum Company it is to establish 80-acre proration units in both the Wofl-camp and Devonian zones of production in the Denton field. We understand that the statewide spacing and proration unit has always been 40 acres in New Mexico and we see no reason why it should be changed in this field.

When 40 acre spacing was adopted in New Mexico by rules and regulations of the Conservation Commission many years ago we presume that the Commission had before it engineering testimony and the facts concerning the rights of lease and mineral owners and that it arrived at the conclusion that 40 acre spacing was fair to all concerned. On the basis of its conclusion a great deal of money has been invested in mineral properties and we have sold leases in this field upon the assumption that spacing of wells and the allocation of production would be upon at least a 40 acre basis.

Our situation in the area around the Denton pool is particularly dangerous from the well spacing point of view because our acreage could very well be on the edge of the structure. It is possible that we may have ownership in areas

where part of an 80 acre tract would be productive and part would not be productive. It is also possible that a well drilled on our property near the edge of the pool and producing at a rate in excess of the single allowable of 40 acres would be washed out by water if this is a water-drive field. We are further concerned that 80 acre spacing will delay the drilling of outside locations in this field because it will require a greater step-out for the drilling of wells to ultimately define the outer boundaries of the pool.

We have noted for example that one of the tracts in Section 35 under which we own minerals has a producing well drilled upon it in the SE¼SW¼ Section 35, Township 14 South, Range 37 East. Instead of drilling an offset well to the north it is now proposed that the 40 acres immediately north of this well be thrown into an 80 acre proration unit with an allowable yet to be determined. If the allowable is not greater than for one 40 acre tract it is certainly most unfair to us as mineral owners. If the allowable for this well is increased to compensate for the situation than it is quite possible, it seems to us, that the well would be producing at too rapid a rate and some of the oil underlying our property will not be recovered. This same situation will apply to our wells producing from the Wolf-Camp in Sections 12 and 13 and will undoubtedly be true in other areas surrounding this oil pool where we own mineral interests.

As royalty owners we do not have available the technical information available to the operators but it occurs to us that

if one oil well will drain 80 acres then there is a lot of drainage taking place which calls for offset drilling by the oil companies.

We have not had an opportunity of determining whether it is recommended that any of our interests be pooled with other interests to make up a proposed 80 acre unit but for the reasons we have stated we must advise the Commission that if such is the case we will find it necessary to resist compulsory pooling of these areas owned by us for the purpose of creating 80-acre proration units.

We wish to protest 80 acre spacing, either temporary or permanent.

MR. SPURRIER: Thank you. Is there anyone else?

MR. McKELLAR: Mr. Ed McKellar for Magnolia. We concur in the recommendation of Phillips that a temporary 80-acre spacing be established for this pool our theory being that there is very little technical data yet determined in this field and should it later prove the better part of wisdom to develop on 80-acre, we could. We would already be on it and should it then prove that we need to go to 40 that door would still be open. It is still physically possible and legally possible to establish 80-acre spacing in the field. It won't be very much longer, so I think that they are going to have some definite program established as a result of this hearing.

It is our thought it might be the better approach to establish 80 acres for a temporary measure. The thought being that if it proved unwise we could always go then to 40-acres.

Of course, the Commission is bearing in mind that there has been a precedent set for 40-acre spacing in this State. There is also provisions in the rules to grant exceptions. The Commission is also under statutory duty to see that no unnecessary wells are drilled. Should the reservoir data later prove that one well will effectively drain 80 acres then, of course, it would be unwise if we let more than one well be drilled to 80-acres. I don't want to prolong the hearing. We just join with Phillips in the request for temporary 80-acre spacing with a fixed pattern, northwest southeast I think or whatever arrangements they have proposed here. We do want to fix the spacing. Whichever way the Commission decides to run it, we want it to be fixed and not flexible.

MR. SPURRIER: Anyone else?

MR. WHEELER: My name is J. D. Wheeler, representing the Ohio Oil Company. We concur with Phillips in their recommendations for 80-acre spacing. Some of our reasons for concurring with them; we believe that this is a field in which pipe can be saved at the present time and still have the field producing the same amount of oil that it would produce on 40-acre spacing.

The McAlester information on their draw down on their

well, I believe, would be applicable to a number of the wells in the field.

We have considered the direct offset to that well and the section from which McAlester well is producing had low permeabilities. We think that with the well drilled clear through the section the draw down would be much less. Insofar as the point that Mr. Colliston brought up about the tract which they have in the southeast of 11, they already have Ohio, Atlantic as partners in the remaining tract which would have to be unitized, and I believe it would be possible for those operators to get together on that unitization. Certainly, Ohio wouldn't expect to share in any of the oil that McAlester has already produced and I believe that particular obstacle could be overcome.

MR. SPURRIER: Anyone else.

MR. SELINGER: My name is Selinger with Skelly Oil Company. It became very apparent from the outset that there are two problems involved. One is the question of proration units and the other is the question of allowable. Also, from the testimony presented here it is quite evident that the information on the reservoir is very meager.

You have the discovery well, the McAlester on production some 18 months. You have the Gulf No. 1, Dickinson an offset on production for approximately a year or more. Outside of those two wells all the other remaining producing wells, the information on them have been disclosed from production of this year.

In our opinion that is a very comparatively short time to promulgate any spacing program. We think that the 80-acre spacing as a temporary measure would probably be the most advisable for the reason that the lack of information makes it necessary for the Commission to proceed very cautiously. If no spacing program is allowed to continue at this time within a very relatively short time, it would be impossible to work out any sort of program other than the 40-acres. As long as a reasonable doubt exists in the minds of the Commission with respect to the drilling of unnecessary wells, we believe that the Commission should take into consideration the statutory provision of Section 12 which provides that no owner of a property, and, incidentally, owner is described by the legislative act as the working interest, no owner of a property in a pool shall be required by the Commission directly or indirectly to drill more wells than are reasonably necessary to secure his proportionate part of the production. To avoid the drilling of unnecessary wells a proration unit for each pool may be fixed, such being the area which may be efficiently and economically drained and developed by one well.

The drilling of unnecessary wells creates fire and other hazards conducive to waste and unnecessarily increases the production cost of oil or gas or both to the operator, and thus also unnecessarily increases the cost of the product to the ultimate consumer.

It is our view that as long as a reasonable doubt

exists that it would be wise for the Commission to establish on a temporary basis the 80-acre units. Now, it is true that all operators advocating 80-acres would much prefer the old established policy of the Commission in following governmental quarter section or quarter quarter sections. The condition that we find the field in today makes that impossible. Therefore, the proponent relying on the actual realities that exist in the field today have to fall back on the density program. They must of necessity disregard the quarter quarter section government subdivisions. As long as that exists it is necessary for the Commission to permit a discretion of the operators to formulate their 80-acre units.

We believe that the Commission as a temporary measure in order to avoid the drilling of unnecessary wells should promulgate an 80-acre unit only on a temporary basis and we believe that they were wise in issuing the Bagley order by letting it die of its own terms, that is the respective and specific limit of one year.

It is also quite evident that the productive limits of this field have not been ascertained and ordinarily the wider spacing units gives that information much quicker than a closer density of 40-acre units as compared to 80-acre units. Now, with respect to the allowable which is the second part of the hearing, we believe that McAlester Fuel and Mrs. Clayton and some of the others have a valid reason for being disturbed about a too rapid rate of withdrawal.

Our experience in Devonian production and also the

experience of Devonian production in this state seems to indicate that a too heavy withdrawal in Devonian should be something that should be avoided. While we are unhappy with the 590 barrel recommended allowable, we believe that in order to get this program off center, we wouldn't have any objection at this time provided that the reservation is contained in the order to permit any operator, whether it be Skelly or any royalty owner the right to come immediately before the Commission to reduce such an exhorbitant allowable if such seems to be the case.

Therefore, we believe that the recommendations of the Phillips and the proponents for an 80-acre unit should be permitted on a temporary basis.

And, incidentally, with respect to a little history if I may be permitted a few seconds, the 40-acre proration unit as probably a few of us know in 1935 was established for production from zero to five thousand feet. At that time we had no production below five thousand feet. In setting up the statewide system of allowables for 40-acres, it was felt that would be adequate to take care of an allowable for the state. Subsequently, when production was found below five thousand feet, the Commission as well as the operators were faced with the question of permitting some incentive for such deeper drilling, so we came up with Rule 505 based on depth.

I believe that the recommendation or the suggestion of the Continental is worth considering now for the reason that not only in New Mexico, but in all other oil states

operators are forced to go deeper and deeper with the resultant greater increase in the cost of drilling.

I believe that this Commission like other state commissions is going to have to be reconciled to the fact that there is deeper drilling, that it takes greater spacing, it takes considerable amount of capital expenditure and the states must give recognition to that fact.

Knowing now that our statewide system of proration seems to be inadequate to cope with the situation, I think the time is now ripe for the plan to come up by joint action of the operators and the Commission for some sort of incentive for such deeper drilling. The question of allowables doesn't necessarily affect the question of proration or development units. I think one is entirely different from the other, but they necessarily come together with somewhat the deeper drilling at the same time with a larger spacing drilling unit, at the same time, they don't want to heavy withdrawal from within that well bore. So, I believe the time is now ripe for the state as well as the operators to put their heads together to work out some incentive for the deeper drilling and the heavy capital expenditures in connection with it.

MR. SPURRIER: Anyone else to be heard. If not, we will take a five minute break and continue with the next case following that.

(Recess.)

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MR. CAMPBELL: At this time we wish to offer our exhibits in evidence.

MR. SPURRIER: They will be received. Anything else? If not, we will proceed with the next case.

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STATE OF NEW MEXICO)
: SS
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of hearing in Case No. 269, before the Oil Conservation Commission on May 22, 1951, at Santa Fe, is a true record of the same to the best of my knowledge, skill and ability.

DATED at Albuquerque, this 7th day of June, 1951.

Ada Dearnley
ADA DEARNLEY, Reporter

My Commission Expires:
June 18, 1955

Original

BEFORE THE

OIL CONSERVATION COMMISSION

MAY 22, 1951

Case No. 270

E. E. GREESON
COURT REPORTER
UNITED STATES COURT HOUSE
TELEPHONE 2-0872
ALBUQUERQUE, NEW MEXICO

BEFORE THE

OIL CONSERVATION COMMISSION

May 22, 1951

- -

Case No. 270: This is the application of Phillips Petroleum Company for 80-acre spacing for the Wolfcamp production discovered in the Bettie C. Dickinson No. 1-B well, Section 12, T.15 S, R.37 E.

MR. SPURRIER: The meeting will come to order. Case No. 270. MR. Graham, will you read the advertisement.

(Mr. Graham reads the notice of publication.)

MR. FOSTER: We are going to try to make this real short. I think we can run through it in a few minutes.

O. P. NICOLA,

having been previously duly sworn, testified as follows:

QUESTIONS BY MR. FOSTER:

Q Mr. Nicola, you prepared some Exhibits for us in this case, have you?

A Yes, sir.

Q You just go to the Exhibits and tell us what they are and what they represent?

A Phillips No. 1 is a plat showing the area surrounding the the Denton field and merely shows the outline of the proposed space area. Phillips Exhibit No. 2 simply shows that one unit involving different ownership would be required for the

for the formation in this field on the basis of present development. Exhibit No. 3 is a tabulation of the production history from the Wolfcamp reservoir beginning in June, 1950, and extending through March 1951, and as of March 31, 1951, this chart shows that there have been 152,000 barrels of oil produced, 333 barrels of water -- pardon me, change that to 1192 barrels of water and 44,421,000 cubic feet of gas. The gas oil ratio average for the field as of March, 1951 is 350 cubic feet per barrel.

Exhibit No. 4 is a graph on which has been plotted the number of producing wells, the total production of oil, the bottom hole pressures and the gas oil ratio. All of those factors plotted against time.

Exhibit No. 5 is a bar graph showing the tonnage of steel required for the drilling of two wells into this reservoir for an average of 253 tons per well.

Here also as in the Devonian we have estimated that by going to 80-acre spacing well, save the drilling of 42 wells for a total of 10,626 tons of steel. Also shown on the bar graph is the cost of completing two wells to the Wolfcamp for an average cost of $175,000.00 per well.

Q Trying to shorten this up, from your study and examination of the field, is it your opinion that one well will adequately drain and develop the 80-acres?

A In view of the small amount of information which we now have on this field, I would not wish to express an opinion

that one well will drain 80-acres. However, I think it is possible and it is our recommendation that the Commission establish an 80-acre pattern for a period of one year with a view to reviewing the data at the end of that time when more information is available.

We would also like to request exceptions as to location for all wells heretofore completed on a spacing pattern different from what we now advocate for this reservoir, namely, that wells be located in the northwest quarter and the southeast quarter of each quarter section. Also, we desire that the Commission grant exceptions as to locations for all wells now drilling to the Devonian on an off pattern location in case such wells may be plugged back and completed in the Wolfcamp reservoir.

Also for all wells, all Devonian wells which may be granted exceptions as to location by the Commission and I am referring to all Devonian wells which have now been completed it is requested that exceptions be granted for such locations as to Wolfcamp wells also.

The object of this request is in order that operators may take advantage of favorable Wolfcamp showings encountered in such twin Devonian wells.

We also request that in view of the information now available the Commission establish as an allowable for a well on an 80-acre unit the same allowable which is now granted for a 40-acre well with deep well adaptation. That is to say a

single allowable.

Q In barrels what would that be?

A 197 barrels a day.

Q For theWolfcamp?

A That is right.

MR. FOSTER: I believe that is all.

MR. SELINGER: Selinger with Skelly. I have one or two questions.

Q In recommending the pattern for Wolfcamp well it is your intention to permit the Wolfcamp wells to be on the same 40-acrs of each 80 acre unit as exists or will exist in the Devonian.

A That is correct.

Q And the same exceptions that will exist or exists for the Devonian will pass over to the Wolfcamp?

A That is right. That is my recommendation.

MR. SPURRIER: Anyone else wishes to question this witness.

MR. McCORMICK: I would like to ask Mr. Nicola what type of reservoir the Wolfcamp is?

A I would prefer - you mean what type of drive?

Q Yes.

A Well, I think right now it is similar to the Devonian. In other words, it is undersaturated. However, we don't have enough, really enough information.

Q It is not a water drive?

A I don't even have available any pressure information. I couldn't tell you. I don't know.

Q How big is the average producing section?

A Well, I would rather let our geologist -

MR. FOSTER: (Interrupting) The geologist can answer that.

MR. SMITH: The producing section varies somewhat from well to well from approximately 20 feet which has been shown on tests to the northern end of the pool. In the southern end of the pool there are stpeaks of pay occurring throughout about a 500 foot interval. Anyone of the streaks not exceeding 15 feet in thickness.

Q What would be the total affective pay in the south edge of the pool?

A The total effective pay.

MR. SMITH: The total effective pay in one well, the best well will not exceed one hundred feet.

Q What type of reservoir do you think it is?

MR. SMITH: Questinnable if it is a water drive reservoir. The lithology in it varies from finely sucrose dolomite to a vugular limestone. We have no information yet to classify it as a water drive reservoir.

MR. McCORMICK: That is all.

MR. SPURRIER: Anyone have any further question? If not the witness may be excused.

MR. FOSTER: I WANT to ask one or two questions of Mr. Smith.

Q Would you recommend 80-acre spacing in this field?

MR. SMITH: I would, yes.

Q Do you have sufficient information at this time on which to base an opinion as to whether one well will adequately drain 80 acres in the field or not?

A That on the basis of present data is difficult to judge.

Q You can't say?

A Can't say. However, if drilled up on 80-acres -

Q (Interrupting) Sir?

A (Continuing) if drilled up on 80-acres we would soon have enough data to base a conclusion on.

Q But you would recommend that the Commission adopt the 80-acre spacing in this field?

A I would so recommend.

MR. FOSTER: I believe that is all.

MR. SPURRIER: Anyone have any further questions of this witness or either witness. If not the witnesses will be excused and we will take up case 274.

Do you have something, Mr. White:

MR. WHITE: I WANT to file an identical statement as we filed in the other case, 269.

(See Case 269 for copy of statement.)

MR. McKELLAR: Magnolia would like for the record

to show that we join in the Phillips 80-acre in the Wolfcamp. By going to 80-acres now we could possibly avoid confusion that we have in the Devonian. Go to 80 until we get enough data to justify some concrete educated conclusion to what we really have.

MR. SCOTT: I would like to make a statement for Shell. As far as Wolfcamp reservoir, we are favorable to 80-acre proration of rectangular shapes with the unit within the same section and with development on either 40-acre tract of the proration unit until the structure is defined and the limits of production established. We are agreeable to Phillips proposed allowable of single 40-acre allowable for each 40-acre proration unit for this reservoir. We would be opposed to any regulation which would prohibit development of a 40-acre tract in the event these 40-acres could not be included in a 40-acre proration unit of rectangular shape within the same section.

MR. HOWARD: R. E. Howard with Atlantic refining Company would like to concur in the recommendation of Phillips Petroleum Company for the 80-acre spacing in the Wolfcamp.

MR. BOSS: R. L. Boss, Gulf Oil Corporation. In regard to Gulf's attitude to the 80-acre spacing in the Denton Wolfcamp, Gulf is in accord with the proposed application provided the wells are drilled as twin locations in order to permit adequate evaluation of the Wolfcamp reservoir in the original well drilled on each unitl.

MR. SELINGER: We concur in the recommendation with respect to the Wolfcamp on the basis that Wolfcamp wells will be located on the same 40-acres that the Devonian wells are.

MR. SPURRIER: Anyone else?

MR. J. D. WHEELER: We would like to have the record show that Ohio supports Phillips recommendation for 80-acre i the Wolfcamp as has been proposed.

MR. SPURRIER: The record will aslo show that Mrs. Clayton's statement was also intended to be included in the record of this case.

(Statement copied in record of Case 269.)

Anyone else? We will take up the next case.

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STATE OF NEW MEXICO)
: SS
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of hearing in Case No. 270 before the Oil Conservation Commission on May 22, 1951, at Santa Fe, is a true record of the same to the best of my knowledge, skill and ability.

DATED at Albuquerque, this 7th day of June, 1951.

Ada Dearnley

ADA DEARNLEY, Reporter.