BEFORE THE
OIL CONSERVATION COMMISSION
State Land Office Building
Santa Fe, New Mexico
November 30, 1960

EXAMINER HEARING

IN THE MATTER OF:

Application of Robinson Brothers Oil Producers for the creation of a new gas pool and for the promulgation of special rules and regulations therefor. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Pennsylvanian production consisting of the N/2 of Section 22, Township 11 South, Range 31 East, Chaves County, New Mexico. Applicant further seeks the promulgation of special rules and regulations governing said pool including a provision for 320-acre gas proration units.

Case 2131

BEFORE:
Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order. We will take next Case 2131.

MR. MORRIS: Application of Robinson Brothers Oil Producers for the creation of a new gas pool and for the promulgation of special rules and regulations therefor.

(Witness sworn.)

MR. BRATTON: Howard Bratton, appearing on behalf of applicant, Robinson Brothers Oil Producers. We have one witness.

MR. NUTTER: Any other appearances in this case?

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox, Santa

Fe, representing Hunt Oil Company.

MR. NUTTER: Please proceed.

RANDALL MONTGOMERY

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, address, and occupation?

A Randall Montgomery, Hobbs, independent geologist.

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

A I have.

Q Are you familiar with the area and subject application?

A I am.

Q Will you briefly give the purpose of the application, the nature of the request made?

(Whereupon, Applicant's Exhibit 1 marked for identification.)

A It is indicated in Exhibit 1, which is an entity of special rules and regulations for the proposed Robinson Pennsylvanian gas pool, where we asked for 320-spacing for a gas condensate reservoir which was encountered at approximately 11,000 feet. It provides for notice and approval for the Secretary of Commission for unorthodox proration or nonstandard units. It provides that a well not be closer than 660 feet to a governmental section line,

nor closer than 330 feet to a governmental quarter-quarter section. Actually, this is for all practical purposes a copy of an existing order in the Pennsylvanian gas pool, which is the closest gas pool we have to this proposed area.

Q Now, Mr. Montgomery, the rules are drafted as proposed rules for the pool, do you suggest to the Commission that they be permanent rules or temporary one year rules?

A Certainly we would like to have a permanent order, but if the Commission feels that more wells will give more information, we certainly will; we would certainly appreciate having at least a year order.

(Whereupon, Applicant's Exhibit No. 2 marked for identification.)

Q Would you refer now to your Exhibit No. 2, which is a plat of the pool and cross section of the wells drilled in the area. The Robinson Brothers Well is the only well capable of producing at the present time and is located in the Northeast Quarter of the Northwest Quarter of Section 22, Township 11 South, Range 31 East, Chaves County. The other two wells on the cross section are dry holes that were drilled in the area. Not the well, the Southeast Quarter, Southeast Quarter of Section 16 being corresponding to the Oil Conservation Commission's records, the Hassie Hunt State C No. 1 Well, this well was drilled back in 1951. The two subjectives, primarily the Devonian on the log, goes on deeper than what's indicated on the cross section, as I have so

indicated. The other two wells were purposely for this Hassie Hunt, the Morrow Sand, and one was producer of the Robinson Brothers Well; the first well was the Samedan after the Robinson Brothers Well, and as you can see, as illustrated on the cross section, the gas sand pinched for all practical purposes. There were some thin sand beds in the well, and I have indicated those in yellow color.

MR. NUTTER: Mr. Montgomery, what is the line of this cross section on this plat here?

A Actually, it's a structural cross section starting at the lowest well and going to the next well.

MR. NUTTER: The Samedan Deborde No. 1, is this Section 15?

A Yes, sir, and the Hassie Hunt C No. 1, which is Southeast of 16.

Q (By Mr. Bratton) So it runs, the Samedan Well is west to the well that is labeled as Hudgens on the plat?

A Yes, sir.

Q And according to the Commission's records it was drilled on the name of Hudgens and the cross section comes back to the Southeast to the Robinson Brothers Well?

A Yes, sir, the reason for that, as I say, following up structure and that is poor in this particular area, because of excellent development of sand in the Robinson Well, and going up structure to the Hassie Hunt Well, the sand tended to shale out and pinch out. However, you will notice on the cross section they

took a drill stem test on the portion of this area, which may be correlative, and recovered 52,000 cubic feet of gas, and then the sand, which in my opinion is probably correlative to the pay, actually had a higher reading to the gas analyzer than was on the well at the time it was drilled, and also, the samples indicate there were shows in that particular sand; thereby indicating the dry holes, not necessarily meaning this reservoir is not under property where these wells are at.

Q That is the North Half of 22?

A That is all that we are interested in.

Q That is where the Robinson Brothers Well is located?

A Yes.

Q The other wells on the cross section are in the immediate vicinity, as reflected by the Examiner's question?

A Yes, sir.

Q Your cross section indicates in your opinion, Mr. Montgomery, the probability of continuity of the sand in the area?

A It does. Probably the sands are deposited in the lower area and the lower area to the south of the southwest, the well capable of producing.

Q Is there anything further you would like to bring out in connection with this Exhibit?

A I believe that is all.

Q Pressures?

A I did want to point out that pressures were relatively

similar to the area, particularly the Robinson Brothers, 4500 and 2500 pounds, that was forty-five minute shut-in pressure on the drill stem test. The shut-in on the Hassie Hunt Well, as you note, were 4225, that was a forty-five minute shut-in; I would like to stand corrected there, the other one was an hour and fifteen minutes on the Robinson Well, indicating a possibility that probably was not as good as in the Hassie Hunt Well or the pool didn't take as long as shut-in pressure and may have reflected the same bottom hole pressure if it had been left over the same length of time.

(Whereupon, Applicant's Exhibit No. 3 marked for identification)

Q Refer now to your Exhibit No. 3, which is the whole Robinson zone.

A Exhibit No. 3 is a graph picture of a four point test on the well; there is good alignment on three points, the first point did not line up right off, it still indicates the well is far better than average character, and it produced 4,330,000 cubic feet with seventy-two draw down under pressure, again substantiating the sample description of the well that it is a porous and permeable formation.

Q In your opinion, that reflects excellent permeability in this well?

A Yes, sir.

(Whereupon, Exhibit No. 4 marked for identification)

Q Refer now to your Exhibit No. 4, which is the log of the

Robinson Brothers Well.

A The log of Robinson Brothers Well -- I direct your attention to the example you have, and I do not have all the information I would like to on this. The area colored in yellow indicates the pay zone, which is a good thirty foot thick. I also have a lithological description on that scale. I want to point out that the lithology in the pay zone is a white quartzitic, very coarse-grained sand, semi-angular sand, very porous grained, no cementation. This is poor, due to the geologic history of this geologic time. We notice on Exhibit 2 where this bed had shaled out. Here we have a very coarse and angular sand, indicating that the source of this supplier for this sand was very near.

Q Is there anything further you would care to point out in connection with the log?

A I believe that is all.

Q If you would give the Examiner the one that has been colored, the point you want to point out.

MR. NUTTER: We will mark that 1. That is Exhibit 4, correct?

MR. BRATTON: 4, yes.

Q (By Mr. Bratton) Your Exhibit No. 5, Mr. Montgomery, is a sample of fluid from this well?

(Whereupon, Exhibit No. 5 marked for identification)

A This is a sample of the fluid that was recovered from

the separator on this particular well. It looks like it is straw colored, gravity 57 degrees, fits all the visual descriptions you have for typical condensate. It's a little bit dead right now, it's been sitting around in the office for about a year.

MR. NUTTER: Is the production from this well sour?

A No, this is sweet. It's almost like machine oil, if you would like to put your finger in it.

(Whereupon, Applicant's Exhibit No. 6 marked for identification)

Q (By Mr. Bratton) Now referring, Mr. Montgomery, to the general area of Southeast New Mexico, please refer to your Exhibit No. 6, which is a regional structure contour map.

A Exhibit No. 6 is a structural contour map, the contoured top of the Missippian limestone; the reason this particular horizon was picked, was because of the good consistent point throughout the area, which is easily picked; it doesn't pinch out and change the lithology as does the Pennsylvanian Section. During the geologic study the sand was very stable, and that was the reason this particular horizon was picked close to the pay zone and gives you a good picture of what was happening at that time. Within the Missippian -- at the time, I would like to point out particularly the Bagley area of the northwest corner of the map, the contours are circulating and indicating much more relief in most of the other areas, and then point out the area of our well, which is in 11-31, and want you to note how close it is to this mountainous

area, and then recall to what I said about what the sand looked like in the producing horizon. In my opinion, I think that probably was what was happening at this time. During the Missippian time, we had a terrible disastrous -- I mean we had mountains uplifted, the relief somewhat bearing in the Sandia Mountains, rather the mountains to the east of us here would be Santa Fe Creek. I think now the situation would be this well was probably drilled, say, in the Santa Fe Creek, Santa Fe Creek, carrying more coarse-grained sediments down its course than would be the sediments being deposited on the hills surrounding Santa Fe Creek. I think that explains why the wells in the immediate area were dry; they shaled out, whereas the sand in the Robinson Brothers Well was very coarse-grain, very porous, very angular. I would like to relate further to the strike of the contours, it falls on about the same datum as the **Empire,** Pennsylvanian or the Red Lake and the Atoka Pool. So it is related structurally and stratographically to a great degree to these pools.

Q Do you have a number of pools marked in red on that map, Mr. Montgomery, what are those pools; are they all Pennsylvanian gas pools?

A Yes, sir, they all are Pennsylvanian gas pools in the area of this map.

Q And most of them from the same sand, from this Morrow sand?

A Yes, for all practical purposes, all of them are.

Q Now, is your analysis of this sand that it is not a blanket type sand, it is more a meandering type sand?

A Yes, sir, it's not blanket in the sense we think of as the Eumont pay or the blanket on the Mesa Verde pay or any other major gas pools in New Mexico. The sand body undoubtedly follows a very tortuous course; I think that has been proven not in just this area, but the other areas. Not particularly the Empire Pennsylvanian Pool, there are four dry holes in the immediate area of the power well. By the way, the Empire Pennsylvanian is probably one of the best gas wells in New Mexico; there are probably not over a dozen wells that have produced more dry gas than has this Empire gas and indicates tremendous reserves yet to be recovered from it. To the Atoka,Grayburg-Atoka Pool, Ernest Leonard Well, there are three dry wells surrounding it; the El Paso is a very excellent well producing from this very same sand body, but yet brown in places in these shale beds,and then in the Anderson, two dry holes surrounding it and the Fren, and also, producing from this same horizon, one dry hole in this pool that I do not have on this map.

Q Of those pools depicted on there, Mr. Montgomery, which pools are on 320-acre spacing?

A The Empire Pennsylvanian and the Atoka Pennsylvanian.

Q Most of the rest of them are one well or two well pools, aren't they?

A One and three well pools, and one two well pool, all

have more than one well, and all definitely 160-acre spacing. I want to point out that the Bagley is on 320, as I stated earlier.

Q Anything else you would care to point out in connection with that regional structure?

A The Bagley-Pennsylvanian Gas Pool does not produce from the same sand as do all these other pools I have mentioned; that is the reason it wasn't included in the cross section, but I believe that covers it.

(Whereupon, Applicant's Exhibit No. 7 marked for identification.)

Q Now, you have depicted on there a cross section; that is Exhibit No. 7, is a cross section depicted on your structure map?

A Yes, sir, it is indicated by the line marked"AA Prime".

Q Please refer to your Exhibit No. 7.

A The purpose of this cross section is to show the relationship stratographically and structurally, that of pools that we are proposing that have the same sand.

MR. NUTTER: Is this line "AA Prime" on Exhibit 6?

A Yes, sir. I pointed out earlier that the Empire Pennsylvanian and the Atoka and the Red Lake Pennsylvanian were for all practical purposes on strike, and the other wells were producing from a far greater depth than here. The other colored vertical is Morrow sand, is vertical, and each of these wells is producing from it,with the exception of the last log on this cross section; but I have correlated that interval with it, as indicated, being

part of the sand pay as based on the shows that were indicated from that well, and further, we did not have the same type of log available on the Robinson Brothers Well, and further, the Robinson Brothers Well didn't go down to the top of the Pennsylvanian, which is the basis for all of these correlations. That is the only reason that log is not on this cross section.

MR. NUTTER: The top of the Missippian, you mean?

A Yes, sir, the top of the Missippian, the Missippian limestone.

Q (By Mr. Bratton) What does this cross section show with relation to the relative structural position of the proposed Robinson Pool, with the pools which are presently on 320-acre spacing?

A Shows it is essentially flat and same position structurally and stratographically in the same interval.

Q Anything else you would care to point out in connection with this Exhibit?

A I believe that is all.

(Whereupon, Applicant's Exhibit No. 8 marked for identification)

Q Refer to Exhibit No. 8, Mr. Montgomery.

A Exhibit 8 is a core analysis on the El Paso Leonard No. 1, which is in the Grayburg-Atoka Pool. Although it's forty some miles removed, this is the best information we have, and the reason I am using it as an Exhibit, I want to point out what the relative permeabilities are in this Morrow sand. They are quite

high, as the core analysis shows. Average permeability in this particular well was two hundred and one hundred millidarcies in the main pay. When you look at this in detail, foot by foot description, you run into many in three or four or five or some in excess of a thousand millidarcies, and looking at the sand of the Robinson, you are probably looking at a reservoir that exceeds this.

Q From all available information, you would have better permeability in the Robinson Brothers Well than you would in this well?

A Yes, sir. And in the Atoka, from the core analysis I had an opportunity to look at it before, the permeability.

Q The permeability would be greater in the Robinson Pool?

A Yes, sir.

Q Anything else you would care to point out in connection with this core analysis?

A No, sir, that is all.

(Whereupon, Applicant's Exhibit No. 9 marked for identification.)

Q Refer to your Exhibit No. 9, which is a decline curve on the Dow A No. 3 Well.

A The Skelly A No. 3 is located in the Fren Pool, it was one of the fields that was developed on 160-acre spacing. There were four wells drilled in the area, three of them were producers, all three were drilled within approximately twelve months of each other, and after relatively short production history, Well No. 21

was abandoned, and then apparently it was due to a rapid decline and productivity and could have been some well bore damage in that well. Then also in Well No. 6, takes were drastically reduced and the operator indicated that it was -- they wanted to produce this field more slowly than some of the other pools in the area had been produced and apparently they were wise in doing that, since the pool was on such close spacing. But you will notice the decline curve prior to the time the cuts were made in Well No. 6; in the abandoned Well No. 21, the decline curve indicated reserves ranging from two and a half million cubic feet; whereas, shortly after No. 2 was abandoned and No. 6 was cut in takes, the decline curve now indicates the well is going to somewhere around five billion or which is the quality well now, and it was when the other wells were producing.

Q This is in the Fren Pool?

A Yes, sir.

Q What does this indicate to you as to whether that pool should have been developed on 160 or 320-acre spacing?

A Well, probably this pool might do well to break even to pay for the investment in it. Probably without counting the four dry holes; whereas, if it had been drilled on 320-acre spacing, the pool would have made money. These were very expensive wells; they are considerably deeper than the Empire and Atoka or Robinson Well, which would make one difference for the costs, and too, they were drilled back in days when we didn't worry about the cost and

wanted to know how soon we could get it done, and drilling contractors have cut down considerably since then, and still all of the money wasn't invested and not going to make any money on 160, whereas they would have on 320.

(Whereupon, Applicant's Exhibit No. 10 marked for identification)

Q Now, refer to your Exhibit No. 10, Mr. Montgomery, which is a decline curve on your Pan American AB No. 1 Well.

A Exhibit No. 10 is a decline curve and you will notice it is much flatter than the Skelly Well, even at its best projection. Volumetrically this well only indicates it should recover somewhere in the range of three million cubic feet of gas. However, if you put it on the pressure versus production curve, well, you will come up with a reserve in excess of twenty-eight million feet, quite a large reserve.

Q What does this indicate to you, the type of reservoir you are dealing with?

A Again, I think that tends to prove what we were talking about a short time ago. We have a meandering reservoir and we have four dry holes around this well, probably one of the largest gas wells in New Mexico. Volumetrically if we use the information as cut in seven-eighths inch hole, you'd have three tubes, and where if we had approximately twenty-eight million cubic feet of gas drainage with the blanket type sand, sand that is probably following extreme courses.

Q Does that indicate to you this well has already drained more than 320 acres or could drain more than 320 acres?

A Yes, it does very definitely. It is already producing in excess of six million cubic feet.

Q Is this pool we are talking about now, the Robinson Brothers, substantially similar to the Empire,in your judgment?

A Yes, sir, it is.

Q And to the Atoka, likewise?

A And to the Atoka, likewise.

Q Anything else you would care to bring out in connection with that Exhibit?

A That is all.

MR. NUTTER: Do you have a copy of that Exhibit you were just referring to?

A Yes, sir.

MR. NUTTER: Now those are in the Empire?

A Empire, yes.

Q (By Mr. Bratton) Have you made a study of the possible economics of the area under discussion?

A I have. We have very little information to go on other than geologic information. We have a log information in pools of 160 and the Fren Pool, we have a log information on the Empire Pool developed on 320, and log information on the Atoka drilled on 320. To be redundant, they are all similar; there is information there to support what I say. We are looking at a very tortuous

reservoir, but we have no production history on the Robinson Well to project a decline curve. We have no core analysis, we only have a gamma ray neutron log to look at to determine reserves; but I would say it probably is a little bit better comparable than possibly the Atoka Pool.

Q Now, the Atoka Pool is on a temporary one year 320-acre spacing, is it not?

A Yes, sir.

Q And as far as the economics are concerned, did you anticipate that you have approximately the same economic situation in the Robinson Brothers Pool as in the Atoka Pool?

A Yes, on 320 acres, it would probably be about six to one, and on 160, about three to one; they compare individually to the Atoka Pool.

Q On the basis of information available in either pool, you can make a conservative estimate or liberal estimate, but in either situation you are not talking about terrains?

A That is right, we are a gas condensate reservoir.

Q Under any situation there are going to be a number of dry holes to be supported out of the pool, are there not?

A Yes, sir, two dry holes already to be supported by the pool.

Q In your opinion, would development on 660 result in economic waste, Mr. Montgomery?

A It would.

Q On economic comparison, do you believe that spacing of the Robinson Brothers Pool on 320-acres for a year is justified?

A Yes, there is no harm that I can see would be done by taking the wait and see attitude to get a little production history to find out what we would have.

Q On the basis of the similar reservoirs to which you have testified, the similar pools to which you have testified, would certainly not be justified?

A The Fren and Hudgens development is on too close a spacing, and consequently, will not make any money. The Empire and Atoka Pool will be drilled on so orderly procedure, and of course, we have more information today than when the Fren Pool was drilled. The Fren Pool to my knowledge was the first gas condensate reservoir in New Mexico. We didn't know how they were going to react, they never react quite like they are going to.

Q Now, is the Robinson Brothers Well going to be on production shortly?

A We expect the connection on or about February the 1st.

Q Would that information and additional wells which might be drilled, would be in position in a year to have additional information available?

A Yes, it's my understanding there are two wells committed to be drilled within the next six months and in the immediate vicinity.

Q Would you care to summarize the evidence which you have

given here, Mr. Montgomery, with particular reference to the rules which you have recommended?

A Well, I feel that there is a very definite possibility of considerable economic waste if this pool is to be forced to drill on 160-acre spacing before we know whether the reservoir will support 160-acre spacing. Again I want to point out that this is a treacherous reservoir, and to point out all the information that we have to date, and the geologic similar point of information that apparently we have an excellent reservoir; we need time for additional wells to be drilled or other bits of production history before we know for sure what we do have; whether the theory will actually fit or not, that is what would like to know.

Q On the basis of comparisons you could make with the other pools which are on 320-acre spacing, all evidence would indicate that one well in this area will economically and efficiently drain at least 320 acres?

A Very definitely. The wells, cost of drilling these wells are rather expensive in this area; actually, 220,000 dollars is what the Robinson Well is going to cost.

Q How much?

A Two hundred and fifteen or two hundred and twenty thousand.

Q What depth are we talking about?

A Approximately 11,000 feet. Also the cost of producing a gas condensate reservoir are much more, they are in the normal

dry gas reservoir range because of your surface separation equipment, which the Examiner is very familiar with. We may even want to put in low temperature separation or perhaps dry absorbtion, plus all the usually low pressure separation on the surface.

Q The rules which you have recommended, Mr. Montgomery, as to 320-acre spacing, do they locate the position of the wells in the 320 acres?

A It states that the wells should not be closer than 660 feet from the section line or quarter section line,or closer than 330 feet to the quarter-quarter section line. Almost in exact copy of the Bagley-Pennsylvanian Pool, which is ten miles to the east of it.

Q Of the type of reservoir you think is present, do you think that rule fits the reservoir?

A I do. We don't know any advance terminologies, this well was a re-entry. At the time it was drilled, they had a drill stem test from this zone that indicated a large major gas reservoir, but our objective was the Pennsylvanian and no market for the gas. Later, these people came in and acquired the well and went back to the pay zone and still spent $215,000 on the well, and have indicated where there are shows and two dry holes and who knows what technology lies in the next eight years,or effect or attitude there will be toward re-entering those holes. The pool also has to support the expense of building a twenty-five thousand foot pipe line.

Q In your opinion, would the granting of your proposed rules on a one-year basis be in the interest of prevention of waste, and would they protect correlative rights?

A They would.

Q Is there anything further which you care to state in connection with this case?

A That is all. The cost of dry hole ranges about one hundred eighty thousand dollars.

Q Did you prepare Exhibits 1 through 10?

A I did.

Q And excluding Exhibit No. 5?

A Except 8 and 5.

MR. BRATTON: We would offer Exhibits Nos. 1 through 10 in evidence, and if the Commission desires, we will withdraw Exhibit No. 5 or leave it with the Commission as they desire.

MR. NUTTER: We will accept Exhibits 1 through 10, and you can have 5.

(Whereupon, Applicant's Exhibits 1 through 10 received in evidence.)

MR. BRATTON: We have nothing further to offer by this witness. I would offer a letter from Tri State Production Company who are owners of acreage in the immediate area.

MR. NUTTER: Just offered as part of the record and not as an Exhibit?

MR. BRATTON: That's right.

MR. NUTTER: Any questions of Mr. Montgomery?

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q Mr. Montgomery, in connection with the lithology of this formation, does it change rapidly in the Morrow sand?

A Very rapidly.

Q Ranging from fine to medium coarse?

A Yes, it could. I would say this coarse grain sand, though, could be of considerable volume and not of a blanket type, as I said earlier; volumetrically, if we use the pattern, and if the well was drilled in the specific location, it would hit the shales and the fine sand that borders this.

Q That was technically the productivity of the sand?

A Well, could cut down to the permeability for all practical purposes.

Q That could effect your determination, one well would drain in excess of 320 acres, would it?

A No, not unless it was too tight to shale through.

Q You don't have any terrific pressurability in the Robinson Well, do you?

A No, sir, not able to obtain it.

Q Have you made any reserve calculation on the logs?

A With the meter information I have available, yes.

Q Could you give us an estimate on that?

A I might. Total reserves, in the range of about seven

billion cubic feet royalty. Talking about someone for the operator, about six and a half billion feet.

Q You are talking about a 320 unit?

A Yes, sir.

Q Now, on your Exhibit 9 you had depicted the Skelly-Dow Well. What pool did you say that was?

A The Fren-Pennsylvanian.

Q And what formation is it completed in?

A The Morrow gas sand.

Q The same sand you are talking about?

A Yes, sir.

Q On the Pan American State "A" Lea 1 S Empire Pool?

A Yes, sir.

Q What sand?

A The Morrow sand.

Q And you think they are comparable wells insofar as the producing formations?

A They are identical, yes, sir.

Q You stated that you anticipated that two additional wells would be drilled in this area. Did you say where they are to be drilled?

A I have no specific information, you understand. One is to be drilled in the half section to the south.

Q Who is the owner of that?

A I believe it's Hunt; Tri State.

Q Now, what amount of fluids does the Robinson Well produce?

A At the present time it produces about 50 barrels of condensate per million cubic feet of gas.

Q Do you expect on the basis of experience in other pools that would remain at that level?

A No, it's not the character of the condensate reservoir to -- it's probably a retrograde type of reservoir. It's not normal for it to do that. If you would like some specific pools in the area, I have them available.

Q I would appreciate having one or two of them if it isn't too much trouble.

Q In the Fren-Pennsylvanian, talking about the Skelly-Dow "A" No. 3 Well, it started out with gas liquid ratio of 19,819 to 1. And the next year it was 24,792 to 1, and the next year it was 25,477 to 1. The next year it was 32,675 to 1. The following year it was 39,332, and 1959 it was 52,656; indicating near the lower stages of this retrograde reservoir the fluid we get at the surface is turning into the fluid in the reservoir. Not much is getting to the surface right now. At a point it all will turn to fluid in the reservoir.

Q Now, in your recommended rules and regulations, I notice you recommend a location not nearer than 660 feet to a governmental section line or nearer than 330 feet to the quarter-quarter section line. In your opinion, will a well so located drain the acreage

dedicated to it as adequately as one located nearer than the center of the unit?

A As the sands are the same, my determination, I would say yes, very definitely.

Q Are Robinson wells in a location which would conform to your recommendations?

A Yes.

Q What is that location?

A 660 feet from the North, 1980 from the West.

Q You recommended the unit have 320 acres. In your opinion, will a well in this sand drain in excess of 320 acres?

A Yes, it undoubtedly will, based on similar performances of wells located in the area, as indicated by the Empire-Pennsylvanian.

Q Do you have any objection to the temporary order of 640-acre spacing?

A No, sir.

MR. KELLAHIN: That's all the questions I have. Thank you.

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

BY MR. PAYNE:

Q Mr. Montgomery, what will be the market for this gas?

A The El Paso Natural Pipeline goes into their Plains-Gallup system.

Q Presently, there is no market?

A No, sir, it's unconnected.

Q Now, is there any market for the condensate?

A It will have to be trucked, it will condensate. It is hard to find someone to transport it. I can't always get posted prices. I have checked, and the nearest possible source that we can get it to, our trucking bill will be twenty-four cents a barrel.

Q Do you feel as if the temporary order which provides for 320 proration units will provide for faster, not only for faster market, but for the wells being drilled faster?

A Yes, very definitely it would.

Q And thereby obtaining production data at a sooner date?

A Yes.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q Mr. Montgomery, what is the location of the Samedan Well north of Robinson Well?

A 24 -- 2320, 10 and 60.

Q That is the southwest quarter of 16?

A Yes, sir.

Q And the Hudgens Well or the Hunt Well is in the southeast quarter of Section 16?

A Yes, sir.

Q And the Robinson Well is in the northwest quarter of Section 22?

A Yes, sir.

Q Now, this well is an adjacent 160-acre tract?

A Yes, sir.

Q And you have one producer and two dry holes. In view of these, how do you contend you can develop a pool on 320 when you have two offsets on five 160 that are dry?

A Well, as indicated through time, we think it's tortuous sand development. This is when you look at the plan as Santa Fe Creek follows the coarse sand, it is deposited. This is based on the geological history of the area during that particular time. And then, too, I point out the possibility that maybe the two dry holes are on the very northern limits of the pool, and perhaps the main body of the pool is to the south and southwest.

Q And the Samelan and Robinson Wells are on adjacent 40-acre tracts, are they not?

A That's correct.

Q Now, I think on the log you indicate that the perforated vertical is from 87 to 910 and there are four shots per foot?

A Yes, sir.

Q And twenty-one abrasive shots?

A Yes, sir.

Q Why, in view of this extreme permeability you have here, why is it necessary to, after shooting the thing with four shots per foot to put in twenty-one abrasive shots?

A I'm not sure why the operator -- I, frankly, didn't know

why they used the abrasive shots. I know from looking at the samples and I know from looking at the drill stem tests, which is recorded on the log, that it certainly wasn't necessary to complete the well because it is very porous, very permeable sand. I might --

MR. BRATTON: If the Examiner please, we have here the geologist who was the president. We will put him on in a minute.

MR. NUTTER: You have the answer to the need of the abrasive shooting?

MR. MORROW: Correct.

Q Actually, of your 10 Exhibits, Mr. Montgomery, how many of them, not counting correlating the logs from wells up to forty-five miles away, how many of them actually indicate the permeability or the ability of this well to produce,based on this well's characteristics only?

A The multi-point back pressure test we have.

Q Your log indicates that you have some angular, very porous non-cementation in this well?

A Yes.

Q This is information from the sample when the well was drilled?

A Yes, sir.

Q So two of the Exhibits of ten show the producing characteristics or possible permeability in one well?

A That is right.

Q And any evidence as to proper drainage from these other

wells located at various points on Exhibit No. 6 would depend on the correctness of the correlation and upon the sand being the same in the Robinson area as they are in some of these other areas?

A I testified they are the same, yes.

Q I say the accuracy of the Exhibits, these other Exhibits would depend on the correctness of the interpretation?

A Yes, sir.

Q Well, now, if you recommended that in your pool rules that the well be located in any one particular quarter section of the section or the well could be located in either quarter-quarter section --

A That is --

Q -- or any quarter-quarter section?

A Any quarter-quarter section.

Q In effect, then, you may be asking for 320-acre spacing or the well could be located on the 160 with 320 acres dedicated to the well?

A That is correct. That is as in the Bagley Pool.

Q Who owns the wells in the Fren Pool, Mr. Montgomery?

A Skelly Oil Company.

Q They own all three of those wells?

A Yes, sir.

Q Were these wells drilled on 160 spacing or were they drilled on locations which would be the same, could be the same as the locations which you have proposed would be approved on 320-acre

spacing in this pool?

A They were drilled on 160. Of course, very apparently, if you restrict the location, it is possible you can have a cluster and still have a 320.

Q The Fren could have been developed in the exact manner it was developed, even under your existing or your proposed rules, could it not?

A Well, there would have been at least one less well drilled.

Q Well, the three wells are located in three different sections, you can certainly get 320 out of each of those sections?

A They would have proved productivity on 320; I am presuming now, looking out of the back of the wagon, it's obvious that part of the acreage is dry. Say, if they dedicate 320 to the north well, it's obvious now part of that acreage was dry.

Q The Robinson Well, Pool, who would have productivity of 320, when there are two offsetting 40's; one producer and one dry hole?

A That's the reason we are asking for 320 spacing, in order to have a cluster of wells and the operators will move further away from your property to develop the acreage.

Q Well, now, under your proposed rules, could the dry holes that were drilled, then, properly have been drilled?

A Well, they, yes, they would have.

Q So your rules wouldn't cause anyone to have to move farther away, necessarily, then, would it?

A Right. Now, we are in the position of having two dry holes that could be that close to us. The next people, they're going to have to get further away. So happens, this dry hole on the north end and on the south end you will actually have 320-acre spacing pattern to the south.

Q Which is acreage which is owned by Tri State?

A South half of 22.

Q The acreage as appears on the Exhibit?

A Yes. What happens, ownership does not always necessarily reflect who is going to be the operator, and Tri State is going to be the operator.

Q Of the south half of 22?

A Yes, sir.

Q Now, you stated that it cost two hundred fifteen thousand to two hundred twenty thousand to drill the Robinson Well?

A Yes, sir.

Q Now, and then what would a well -- that is an old well that entered?

A Yes.

Q How much for a new well?

A Approximately the same.

Q One hundred eighty thousand for a dry hole?

A Yes, sir.

Q The ratio on this Hunt Well, did you give that?

A It's 19,946 to 1. I want to correct the decimal. 19,976.

I am pointing out, as I pointed out earlier, this is a retrograde reservoir. This ratio will not be maintained for any substantial period of time. It will depend on pressure; the minute, as you know, when we get that particular point, then our ratio is going to skyrocket.

Q Do you anticipate there is going to be any consistency in the production of the liquids that are left in the reservoir at the time the gas is produced, by the encroachment of water into the sand?

A We have no evidence it is a water drive. I would suspect it probably isn't. This is going to be pressure driven.

Q The Morrow sand is not characteristically known as water drive sand in Southwest New Mexico, is it?

A No.

Q Any liquids that do come out of the gas and are left in the reservoir as liquid will usually be left?

A In the retrograde reservoir you are going to recover approximately fifty percent of the total reserves. What happens, you have increasing ratio, liquid ratio and less fluid. Then, finally, you get to the point, what furnished the fluid into it is going to have further impact upon the gas and you will get some of it in that pattern. You are going to leave about fifty percent in there, which, I think, is an excellent water drive.

Q Do you think there is a possibility of secondary recovery at a depth such as this to recover the fifty percent that is left

in the reservoir?

A I say this, if this is a reservoir of major proportions and if they want unitization and are going to be reinjecting dry gas to pick up the liquids,that would be a possibility, yes, sir. If it connects, it will have to be a large reservoir to do that.

MR. PAYNE: You dedicated 320 to one of these wells. In this well you get a dry hole. How much acreage could be considered dry?

A Well, I think normally in determination of the data you have just an equitable determination of what is dry acreage, particularly after more wells are drilled.

Q In other words, you don't think the entire 320 should necessarily be considered dry?

A Not if you get a producer, no, sir.

Q If you get a dry hole?

A If you get a dry hole, oh, oh, no, I don't think it has ever been the Commission's policy to rule in that manner. I'm not, I mean just -- you get a dry hole and maintain that 40 is dry and the rest of it is --

Q Isn't the same on the producer, only 40 is producer and the rest is dry?

A That is quite possible, yes, sir. Very possible.

MR. NUTTER: Mr. Montgomery, speaking of Commission policy, you probably are aware that the Commission over a number of years has had the policy of not naming pools after the operator

that is operating in the pool. Do you have an alternative in the event the Commission should want to pool this previously set policy?

A I hadn't thought about the name very much either right now. The Rose Well, the Venture, we might call it Channel 8 Pool.

Q This is tortuous channel this sand is laid in anyway, call it the Tortuous Pool.

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

BY MR. MORROW:

Q Mr. Montgomery, with relation to the question the Examiner was asking, you give your real and fixed locations within 320 acres, you suggest these rules are flexible locations, due to the nature of the reservoir. Is that your reason for suggesting the flexible location?

A Yes, sir. It's supported by the Pan American Exhibit where the volumetric reserves were three billion, probably actually produced twenty-eight billion in the four dry holes in the pool.

Q If the Commission should feel better on fixed location, you would have no objection?

A No, sir.

Q With relation to the questions Mr. Payne was asking you as to the amount of acreage which should be considered dry or productive, in case of a dry hole or producer, you have the same problem when you have 160-320, do you not?

A Yes, sir.

Q Actually, you have there a mixed question of geology, and

the status and Commission policy, don't you?

A Yes, sir.

Q As to the Examiner's questions with relation to the dry holes immediately offsetting the Robinson Brothers Well, that same situation exists in the Empire Pool, does it not?

A It does.

Q And as the Examiner pointed out, we don't have anywhere near the information we would like to present, that's why we are asking them for one-year order in order to obtain time to assemble information?

A Yes, sir.

Q On the basis of what information we do have, as to comparative pools, you believe that a temporary 320 order would be justified?

A Yes, sir. I would like to point out one thing. We have been talking about these two dry holes. I do want to point out the Hudgens Hassie Hunt State "C" No. 1 Well was drilled approximately eight years ago. We did a post drill stem test on this well. We have shows indicating a gas well. We also did a post drill stem test on the re-entry that the Robinson Brothers made, but the operator plugged that up. The Hudgens Well may not be a dry hole. Technically, the Samedan is a dry hole, we don't think it is commercial right now. Intermittently, there is some pay in the Samedan Well. Intermittently, there could be quite a bit of pay in the Hassie Hunt Well completion. And the Samedan Well did not justify

completion under present day situation. You couldn't complete a gas well in this area back eight years ago, there was no possible market. The pipeline we plan on connecting to was not built until three or four years ago. If they had gotten a gas well, their nearest market would be seventy-five miles away.

Q Now, you say Tri-State owns the south half of Section 22 in the area?

A They are the people who have entered the plea supporting 320-acre spacing in this case, yes, sir.

MR. BRATTON: Do you have anything further?

MR. MORROW: That's all I have.

MR. NUTTER: Mr. Montgomery, I notice on your Exhibit No. 2 that on the Samedan there is a pronounced kick developed at 920 on the Hassie-Hunt Well. Would this kick on these two wells correlate? Which is the well that is developing at about 950 on the Robinson Well?

A That's the point, the contour, the map is contoured on.

Q On your plat on Exhibit 2?

A Yes, sir. I didn't point out that on reproduction, that line didn't show up very clearly. There is a very faint blue line, if you will note, connecting these points.

MR. NUTTER: Any further questions of Mr. Montgomery? You may be excused.

(Witness excsued)

MR. NUTTER: Do you have anything further?

MR. BRATTON: We will put on one witness to answer the Examiner's questions.

(Wintess sworn)

CHESTER F. SKRABACZ,

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name and occupation?

A My name is Chester Skrabacz. Consulting geologist of Midland.

Q Have you testified as an expert witness?

A Yes, I have.

Q Are you familiar with the Robinson Brothers Well in connection with this hearing?

A Yes, I am, very much.

Q As a matter of fact, were you the resident geologist on that well?

A I witnessed samples, I ran the samples on these wells. I helped pick the perforations. I witnessed the drill stem test, and I also went out on location when the Samedan Deborde Well was being drilled here, this post drill, and looked at those samples. I looked also at Hunt 1 "C" State.

Q The Examiner was questioning as to the completion practices on the Robinson Brothers Well. Would you explain how it was com-

pleted and why it was completed in that fashion?

A Well, after the drill stem test indicated a pretty high pressure gas well, the operator decided not to take too many chances. He ran his 5½-inch casing down to 11,000 feet and cemented with 200 sacks of custommade cement and ran a temperature survey that indicated that cement to be up to 9750. And taking no chances, he went into the hole to perforate the pay from approximately 10,865 to 10,915. A slight correction in that log, and perforated through tubing using a tubing gun which we know is a very small powerful, very small limited power gun. They shot four shots per foot from this 10,865 to 10,915, and after swabbing the hole dry, they had no reaction. So they figured that the shots weren't penetrating horizontally to get into the pay, so they pulled the tubing out and ran in there and used a swing jet perforating gun, and there again it was perforated the same interval, four shots per foot, and the result of that was no reaction as to -- I believe they did have some small gas shows, nothing like the drill stem indicated, where it was over 22 million, and as a last resort, they came to the conclusion they may have cemented off their very permeable sand, and they brought in an abrasive jet gun and perforated twenty-one abrasive shots into the same interval, scattered into the 10,865 to 10,915 pattern, and this again gave them a slight increase of show, but still nothing like it had been on the drill stem test. So then they began acidizing it and the first acid job was approximately 1500 gallons of mud acid. Then they had very poor results

and went back in with 8,000 gallons of mud acid and using some moth-balls with the acid to possibly break through into the reservoir; and they had, I think, close to several cubic feet a day. As a last resort, they gave it 25,000 gallons of acid, using moth-balls, and this last acid job proved to be fairly or just mediocre with success. However, at this time the well came back to several million cubic feet a day, and they figured that was enough money spent. Their cost of that acid perforating ran to thirty thousand dollars. The check factor is very, very important. Since they got back some gas they were satisfied and for commercial reasons, and came back to give it the 4 point drawdown tests several weeks later. In this well we have 85 and 5/8 down to 3600 after 5½ down to 11,000. That's all I have to add to that.

Q As a matter of fact, is it not the exception when bullets or jets will penetrate a good cement job?

A Usually -- that's right. Usually, a bullet will penetrate the casing and cement and may enter, let's say, less than 5 inches into formation, and the abrasive jet may go as much as ten inches. That is the most powerful gun, I believe, we have to date. We definitely concluded, and, I believe, the opinion of all of the engineers and geologists and people concerned, as well, that formation was so permeated with so much cement, and they were very fortunate to get it back. And of all the cases in the area, this is the first well compared, as Mr. Montgomery mentioned, the Fren area, Atoka area and the Empire area where this is the first well that had

such cement trouble.

Q Mr. Skrabacz, you heard the evidence of Mr. Montgomery in this case. Then, you were the resident geologist on this well, as a matter of fact, you originated the well?

A That's right.

Q In your opinion, do you corroborate the testimony of Mr. Montgomery as to the nature and lithology of this well and as to the correlation of the other Morrow Sand follows which re related it?

A I couldn't concur very definitely.

Q In your opinion, is this well a highly permeable well and capable of draining the 320 acres requested?

A Very much so.

MR. BRATTON: Nothing further. If the Examiner has any further questions --

MR. NUTTER: No further questions of Mr. Skrabacz. Do you have anything further? Does anyone have anything further in Case 2131? Recess until 1:15

(Noon recess)

MR. NUTTER: The hearing will come to order, please. We will resume now with Case 2131.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, appearing for protestant, Hunt Oil Company. We will have one witness; I would like to have him sworn, please.

(Witness sworn)

J. T. HOLLIS,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A J. T. Hollis, H-o-l-l-i-s.

Q By whom are you employed and in what position, Mr.Hollis?

A Employed by the Hunt Oil Company, Dallas, Texas. Regional geologist.

Q Have you had any experience -- educational training as geologist?

A Yes, sir. I am a graduate geologist. I have ten years' experience in the industry.

Q Would you just outline briefly what your educational experience has been?

A Received the Bachelor of Arts degree in geology at Baylor University 1950. Three years' geophysical experience South Louisiana South Texas, off shore Texas and Louisiana. Experience in subsurface and field geology in West Texas, and more recently I was employed by Phillips Petroleum Company in the capacity of reservoir geologist and log analysis before joining Mr. Hunt a year and a half ago.

Q You've been with Hunt Oil Company for a year and a half?

A That's correct.

Q Does the region which is under your supervision as regional geologist include the area involved in this hearing?

A Yes, sir, it does.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir. Please proceed.

Q (By Mr. Kellahin) Mr. Hollis, have you prepared a map showing the lease ownership in the area?

A I have, yes, sir.

(Whereupon, Hunt Oil Company's Exhibit No. 1 was marked for identification.)

Q Referring to what has been marked as Hunt Oil Company's Exhibit No. 1, would you discuss briefly what is shown on that Exhibit?

A That is a lease map of the area that we are concerned with showing portions of Chaves County, New Mexico. The acreage colored yellow is acreage under lease by Hunt Oil Company or its other organizations.

Q Now, have you made a study of the structure in the area involved here?

A Yes, sir, I have.

(Whereupon, Hunt Oil Company's Exhibit No. 2 was marked for identification.)

Q Referring to what has been marked Hunt Oil Company's Exhibit No. 2, would you discuss that Exhibit?

A Exhibit No. 2 is a subsurface structure map of a portion of Chaves and Lea Counties, New Mexico. contoured on the map of the Mississippian limestone,and shows the structural configuration as seen on the Mississippian of the area in question.

Q Now, that structure map does not conform entirely with the structural maps which were prepared by the applicant in this case, does it?

A Well, perhaps, this certainly isn't quite as broad as is the previous map submitted. The area is a little more concise here and I have tried to use a little more detail, as much as I possibly could with the existing control.

Q What is your existing --

A Existing control is wells shown on the map; the first well, the Hall State "S" No. 1 in Township 10 South 11, 31 East -- excuse me -- I mean that would be Section 19 the Stanolind No. 1 Pole Cat Canyon in Section 32 -- excuse me -- I am mistaken about that. Let me make corrections. The -- I am sorry -- the Stanolind Well is in Section 34. These sections have not been marked. Southeast of that Stanolind Well, approximately three miles, is the Hammond and Debarde Pritchard Amarado State No. 1. That well is in 11 South, 32 East, Section 16, I believe that is. Four, approximately four and a half miles west of the Hammond Well is the Samedan No. 1 Debarde, Section 15, Section 31 East, Chaves, and immediately south is Robinson Brothers Monroe Elliott, Section 22, 11 South, 31 East. Two and a half miles south of the Robinson

Brothers Well in Section 34, is the Phillips Petroleum James 1-A, and the last well to the northeast, five miles approximately, the Atlantic No. 1 Federal, Section 7, Phillips. 11 South, 31 East.

Q In your opinion, does that accurately reflect the structure in the area involved?

A Yes.

Q Have you prepared some cross-sections, Mr. Hollis?

A Yes, sir, I prepared two cross-sections, one essentially northeast, southwest and another one that is labeled AA Prime.

Q On Exhibit No. 2?

A Yes, sir, on Exhibit No. 2. Also on Exhibit No. 2 an east-west cross-section BB Prime.

(Whereupon,Hunt Oil Company's Exhibit No. 3 marked for identification.)

Q Now, referring to what has been marked as Exhibit No. 3, -- are you finished?

A One other thing. The shaded area which is shaded red on the structure map is the area we would like to see, we are proposing to form 640 gas units in the Morrow Sand.

Q Does that complete your comments on that Exhibit?

A That completes that Exhibit.

Q Referring to what has been marked Hunt's Exhibit 3, would you discuss that Exhibit, please, being north-south cross-sections?

A We prepared Exhibit No. 3 which is cross-section AA Prime extending some seven miles northeast, southwest from the Hall State

Well to the Phillips No. 1 "A" James to show the presence of the Morrow Sand in these wells, or to show continuity of the Morrow in these particular wells. The northernmost or the well on the right-hand end of the cross-section is the Hall No. 1 State. We go from there to the Stanolind Well further south to the Robinson Brothers south, and further south to the Phillips James Well. Now, I have lined these logs up on the approximate top of the bend and which I feel is a control tie marker on each log. A little bit difficult to see this right off, perhaps because all of these logs are not the same type survey. However, I feel confident these correlations are correct. The next correlation is the top of what I prefer to call the Morrow zone. The next line does not have any particular designation. I just threw that in there to show an additional correlation, trying to define this Morrow Sand zone as it appears to the logs, and the last correlation is the top of the Mississippian. I might add right here the Mississippian top on the Robinson Brothers Well was necessary to -- it was necessary to project that just a few feet because it didn't show up real good on the log. However, we did another log when this well was finally drilled by Hunt Oil Company which had a definite limestone calculation at that point, which would be 11,010 feet. To go a little further, if you observe the correlation on the top of the Morrow zone and the next line immediately above that, look at that point in the Hall No. 1 State. We see Morrow sand developed there. This was not tested in this well as it was drilled, but it is present.

The next well, the Stanolind Well, the sand is very much in evidence here. Incidentally, a drill stem test was conducted in part, actually the test included all of this zone and some additional, for the additional section, and there was a recovery of about 1875 feet of gas cut mud.

MR. NUTTER: Do you know if Stanolind was drill stem tested?

A This is in the Polecat Canyon, the drill stem tested 10,625 feet to 10,876 feet.

Q They recovered?

A The recovery was as follows: 23½ gas in surface to ten minutes, no estimate. It recovered 1,875 of heavily gas cut mud. If you want this other information, the flow pressure ranged from 325 to 375 pounds. Shut-in pressure of 1,534 pounds in fifteen minutes.

Q They actually did make free gas to the surface?

A That's right.

Q No measurement of this?

A No measurement of it. Someone might raise the question about the shut-in pressure, this well being so low. However, it's been my observation on many, many drill stem tests shows shut-in pressure equilibrium in there on the shut-in for fifteen minutes. That zone correlates south into the producing interval in the Robinson Brothers Well. South of the Robinson Well is the Phillip 1 "A" James. The same is present here but is not as well developed.

But I think that is a definite correlation and this shows the continuity of the sand on the northeast, southwest line which is essentially seven miles in length.

Q Were there any tests on the last well referred to which is the Phillips?

A The Phillips Well, no, sir. I don't think there were any tests in that interval.

Q Does that complete your comments on Exhibit No. 3?

A Well, I might say this, just because there were no tests run, in my opinion, that doesn't necessarily mean that sand will not produce because in many, many instances we see these grey sands where they have no show in them whatsoever in the cuttings. I just wanted to mention that.

(Whereupon, Junt Oil Company's Exhibit No. 4 was marked for identification.)

Q Referring to what has been marked as Hunt's Exhibit 4, will you discuss that Exhibit?

A Now, Exhibit No. 4 is east-west cross-section, east on the right-hand side of the section, from the Hammond and Pritchard Amarado State and which is in Lea County, it's west. And again using the Robinson Brothers Well as a key well, into the Hassie Hunt Tri-State 1-C there and finally to the Atlantic No. 1 Federal. Here again I made the same correlations, the logs are hung on the top of the bend on the Hammond Well. We see the Morrow Sand present from approximately 10,709 to 10,860, not too well developed there.

Then we come west to the -- come into the Robinson Brothers Well again, and immediately west of there roughly, I will say, immediately, roughly half a mile is the Hassie Hunt No. 1 State "C." There is nothing very interesting that happens here, the sand has shaled out there, it's not present. And I might add right here our drafts might have a slight error on our correlation. I had to mark out the blue line print, or at least part of it, and pencil in the correct correlation of the top of the Morrow zone over to the Atlantic No. 1 Federal. You notice we come up-dip rather fast between the Hassie Hunt Well , and the Atlantic Federal, and naturally, the sand is not present with the Atlantic Well and the section where it should has practically disappeared. There may be 10 feet of it left. So, in summing this thing up, we can see the sand present, going from east to west over to the Robinson Brothers Well and as we proceed west, taking in the Hassie Hunt Well and the Atlantic Well, the sand is not developed, shaled out, or whatever may be the case.

Q The basis of the information, then, how far to the east from the Robinson Well would you say the reservoir extends?

A Well, we've seen it in the Hammond, it's not as well developed but certainly it extends almost to that, to that well, and I certainly feel like this is a continuous reservoir from approximately the Phillips Well north to the Hall Well, from the Robinson Brothers Well to the Hammond, and Atlantic Pritchard Well and is probably pressure connected.

Q You heard the testimony of Mr. Montgomery in which he described the sand as laid down in tortuous fashion. Have you any comment on that testimony?

A Well, of course, those things do happen. However, I feel like in this instance we can see the sand as more or less of a blanket condition within the confines of this area, by subsurface correlation.

Q Now, you heard Mr. Montgomery's testimony in regard to the lithology of the sand. Have you any comment on that testimony?

A Very characteristic of the Morrow sand is his description of lithology, the sand can change from coarse to medium to fine grain. However, it's been my experience in working the Morrow especially in the Oklahoma Panhandle and Western Oklahoma that does not necessarily preclude a good productivity from a gas well in the Morrow.

Q You heard Mr. Montgomery's testimony in regard to the permeability of the Morrow sand, in the area involved here. Are you in agreement with that testimony?

A Well, of course, in this immediate area we don't have any permeability figures either. I feel, I am of the opinion the Robinson Brothers Well has an extremely good permeability.

Q On what do you base that conclusion, Mr. Hollis?

A Well, first of all, the productivity of the well itself, it's capability; secondly, I might add this, I have analyzed the Robinson Brothers Well, I have worked several zones in here for

porosity. It ranges from 10 to 15 percent. I would like to point out there is a neutron current and in this range of porosity your neutron is not your best porosity device. This is probably pessimistic.

Q You are referring to which log?

A The Robinson Brothers Well.

Q And you say, in your opinion, that log may indicate a pessimistic porosity index?

A I want to make that clear. I think it is better than that. For instance, if we had a microlog of this well, I feel like we could have calculated porosities in the nature of twenty percent. I believe, it's my opinion, that that is characteristic of the Morrow in this area. We see fifteen percent on the neutron current. I think it's more than that.

Q Have you made any calculation of possible recoveries from this reservoir?

A Yes, sir, I have.

Q How did you make that study?

A I made a volumetric calculation using data mostly from the Robinson Brothers Well porosity shut-in pressure. Incidentally, I used -- I took a shut-in pressure of the Hassie Hunt Well into consideration. They are practically the same at that depth. I think there is variance of about 300 feet. There isn't too much shift but it's representative. I assume a water saturation of thirty percent for this sand. For this porosity, it's been my experience, too,

that thirty percent or fifteen percent porosity is a good figure. It certainly is that, possibly even less, due to the fact that well hasn't produced any water. It's certainly very, very much below critical water saturation. From that data, I calculated my reserves.

Q What effective pay did you assign to it?

A For the reservoir, I used a net effective pay or net effect sand thickness of 20 feet for the reservoir. It's -- the Robinson Brothers have somewhat in excess of 20 feet, but the 20 feet is an average for the reservoir.

Q On the basis of that analysis, what would your conclusion be as to the reservoir?

A Based on my study, both from subsurface information, production information, log analysis, everything we did, the reservoir is continuous between the limits of the two cross-sections that I have submitted; is pressure connected, and certainly lends itself to 640-acre spacing.

Q What reserve figure did you arrive at there, Mr.Hollis?

A I arrived at ten billion cubic feet.

Q That's on 640?

A That's 640 spacing.

Q You stated that in your opinion one well would drain 640 acres. What is the basis of that conclusion?

A I base my conclusion on that, on the perimeters that we see in this well, porosity, water saturation, the permeability that

is no doubt there. Good permeability, plus the fact that the sand is present, within the confines of my cross-sections and would certainly drain 640 acres.

Q It is your recommendation the pool be spaced on 640 acres?

A Yes, sir, that is our recommendation.

Q Would you accept such an order on a temporary basis until further reservoir basis is obtained?

A A temporary 640?

Q Yes, sir.

A Yes, sir.

Q In connection with the spacing of these wells, have you any comments on the recommendations which have been made by the applicant on well locations?

A Well, the only thing I have to add to that is that the 330 feet footage figure used from a section line, I would recommend that be extended to 900 feet.

Q 660?

A 660 be extended to 990. That would present for better protection of everyone's correlative rights.

Q Have you any other comments on the recommended rules which have been submitted by the applicant?

A The only other comment I have, I feel like this area is capable of draining 640 acres.

MR. KELLAHIN: Do you have any other comments to add, Mr. Hollis?

A Well, if I might make these -- a few general statements, I would like to do so. It's been the policy or the theory of Hunt Oil Company to advocate and operate on wide spacing. We feel that everyone's correlative rights would be better protected in that way and everyone will certainly get his or her fair share of the hydrocarbons present. We feel like, that 640 spacing will prevent waste. In other words, we feel one well will drain 640 acres as well, and will probably recover ultimately as much gas as a denser drilling program might. We think that 640-acre spacing will certainly lead to an orderly development program and will prevent the drilling of any unnecessary wells in this area.

Q Would you consider that drilling and developing the area on 320 spacing would constitute waste and drilling of unnecessary wells?

A Yes, sir, I think it will drain 640.

Q Certainly. You also agree, then, with the applicant, that a well drilled on 160 would constitute drilling of unnecessary wells?

A Yes, sir.

Q Then to the extent that the applicant seeks 320-acre sections?

A Yes, sir, we are.

Q You are seeking that the spacing be 640?

A Yes, sir.

Q Were Exhibits 1 through 4 prepared by you and under your

supervision?

A Yes, they were.

MR. KELLAHIN: I would like to offer Exhibits 1 through 4.

MR. NUTTER: Exhibits 1 through 4 will be accepted.

(Whereupon, Hunt Oil Company's Exhibits 1 through 4 were received in evidence.)

Q (By Mr. Kellahin) Do you have anything else to add?

A Yes, sir, I have these additional comments. Assuming we would establish 640 spacing, we would certainly want an allowable based on the productive acreage in that given unit.

Q In other words, if there were a dry hole in portions of the unit, would you consider that area to be productive?

A We would certainly want that acreage proved productive. It might be a dry hole, it might be a fault if they exist. That is the way we feel on that.

Q Have you as yet found any evidence in faulting in this area?

A Not right here. One other thing I would like to mention is this: assuming 640 spacing units are granted, we would like to locate a well per 640 acre unit, let's say the exact distance from the center of the section, possibly, maybe a thousand foot tolerance from the center of the section.

Q Would that tolerance, in your opinion, take care of any differientation in the structure sand development in the reservoir?

A Yes, sir.

Q Is that the reason you recommend that?

A Yes, sir. One other thing I would like to add, we feel that other companies, major or otherwise, would certainly prefer 640-acre spacing formation out here.

MR. KELLAHIN: That's all the questions I have, Mr. Nutter.

MR. NUTTER: Does anyone have any questions of the witness?

BY MR. BRATTON:

Q Mr. Hollis, do you understand that the statewide rule on gas spacing is 160 acres?

A That's my understanding, yes, sir.

Q Would you prefer 320-acres to 160-acres?

A Yes, sir.

Q So, in essence, your position with reference to the Robinson Brothers request is that we have been modest in your request?

A Yes, sir.

MR. BRATTON: I think that's all.

A May I? I appreciate the opportunity to come out here and visit with the Commission my first trip out. I appreciate all the courtesies extended, and I speak for Hunt Oil Company also.

MR. NUTTER: You stated it was the policy of Hunt Oil Company to advocate wide space. Does the drainage, present drainage or drainage policy reflected, is that reflected by your appli-

cation here or statement here today?

A I might say this, Mr. Examiner, we prefer wide spacing. We feel like we will ultimately drain as much acreage as a denser drilling program would on that basis.

Q Do you have any actual basis for coloring these various sections red which you have colored red on your Exhibit No. 2, other than the belief this is a blanket type sand?

A We felt like that was -- these were the closest sections to the well that was to the closest completed well, and they should be first spaced. In other words, this 640-acre designation I have here in red could be extended or contracted pending future or additional development.

Q We already had some development in Section 15, which would tend to eliminate the section, wouldn't you think?

A Yes, sir, but I don't feel that entire 640 acres is entirely devoid of sand or is unproductive.

Q Now, another thing you stated, Morrow sand was developed in the Hammond Anderson-Pritchard State Well over there in Section 16, 11 South, 32 East. I note that on your contour map you show a synclinal low occurring in the west half of that Township and in the extreme eastern portion of Township 11 South, 31 East. Do you see Morrow sand across that synclinal low?

A No. I think this is --

Q Do you think it is productive of gas through that low?

A I think it would be very likely.

MR. NUTTER: Any further questions of Mr. Hollis? Does anyone have anything they wish to offer in Case 2131? We will take the case under advisement.

STATE OF NEW MEXICO)
) ss
County OF BERNALILLO)

I, Lewellyn Nelson, Court Reporter, in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported in machine shorthand and reduced to typewritten transcript under my personal supervision, and that the same is a true and corredct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, thed 16th day of December, 1960, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Lewellyn Nelson
NOTARY PUBLIC

My commission expires:

June 19, 1963

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2131, heard by me on 11/30, 1960.

....., Examiner
New Mexico Oil Conservation Commission

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 11, 1961

IN THE MATTER OF: Application of Robinson Brothers Oil Producers for the establishment of 320-acre gas proration units in the TV-Pennsylvanian Gas Pool, Chaves County, New Mexico. Case 2131 will be reopened pursuant to Order No. R-1839 to permit the applicant and other interested parties to appear and show cause why the TV-Pennsylvanian Gas Pool should not be developed on 160-acre proration units.	CASE NO. 2131

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 2131.

MR. MORRIS: Case 2131: In the matter of the application of Robinson Brothers Oil Producers for the establishment of 320-acre gas proration units in the TV-Pennsylvanian Gas Pool, Chaves County, New Mexico.

MR. BRATTON: Howard Bratton, Roswell, New Mexico, on behalf of the applicant. We have one witness.

(Witness sworn.)

MR. UTZ: Are there other appearances in this case?

RANDALL MONTGOMERY,

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, occupation and place of business?

A Randall Montgomery, Hobbs, New Mexico, independent geologist.

Q Did you testify in the hearing on this matter which was held a year ago?

A I did.

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

A I have.

Q Have you kept track of the events and developments in this pool during the intervening year?

A I have.

Q Review very briefly, if you would Mr. Montgomery, what the situation was a year ago at which time we asked for temporary 320-acre spacing in this pool.

A A year ago we had a shut-in gas well called the Robinson Brothers Manley-Elliott No. 1 located in Township 11 South, Range 31 East, in Section 22. At that time we had had

no production history at all other than drillstem test data. We came to the Commission and asked for 320-acre spacing and since that time we have been producing gas and we have taken two bottom hole pressure tests on this well in order to comply with the request of the Commission to obtain as much data as we possibly could to show the Commission why we need 320-acre spacing.

Q Mr. Montgomery, referring to what has been marked Exhibit 6 in the original hearing, I believe that's the plat of the Mississippian pools in the general area. Would you detail very briefly what your testimony was as to the nature of this reservoir as compared to other similar reservoirs throughout Eddy County?

A My testimony was that this is producing from the stratigraphic horizon as all the pools on the map; and that they're all very similar in character to a degree. Ours was perhaps complicated by the fact that we had a coarser grained reservoir and a more erratic appearing field than perhaps some of the others. Altogether there are a number of one-pool reservoirs. In this formation it would appear that we have added another one pool reservoir. That's due to the fact that since the hearing there has been a third dry hole drilled in the area we are now. We now have a dry hole to the North, to the Northwest and due South of the producing well.

Q That would be shown on what was marked as Exhibit No. 2

hearing a year ago, Mr. Montgomery?

A Since a year ago we have produced this well and have taken two bottom hole pressures, as I stated earlier. The first one was on July the 11th of 1961, the bottom hole pressure at that time was 3,901 pounds. We had a gas gradient in the tubing all the way. There's no fluid in the hole. We took our

second bottom hole pressure December 8, 1961, and we had the same result. During the producing--

MR. UTZ: The same pressure?

A Sir?

MR. UTZ: The same pressure?

A No, there was a 254 pound drop in pressures. Based on that interval, from the two bottom hole pressure tests that we have, the well has produced 717 MCF per pound drop. Originally, the only pressure we had was a drillstem pressure which was 4,392 pounds. I have reason now to doubt the accuracy of that test based on the producing life and the two new bottom hole pressures that we have. The reason for saying that is that the drillstem test bottom hole pressure was 4,392 pounds, and to the date that we took our first bottom hole pressure test with conventional bottom hole bombs, we produced 487 MCF per pound drop using the drillstem test bottom hole pressure and the initial bomb test. From the original bottom hole pressure drillstem test bomb and then the conventional bombs that we ran on December 8th of 1961, we produced approximately 555 MCF per pound drop. Now, taking the period of time from when the two bombs were run and ignoring the drillstem test bomb, we produced at the rate of 717 MCF per pound drop. So we are talking about a 75 per cent apparent increase in the reserves after producing approximately nine months, due to these differences in bomb pressures. Therefore, I would tend to disregard the pressure

taken with a drillstem test at this time.

Q What conclusion do you draw from the pressure information that you have obtained during the year, Mr. Montgomery?

A It indicates on the basis between the interval of time of the two bombs that were run, we are looking at the range of 2.6 billion cubic feet of reserves.

Q On the basis of the information a year ago, what were your estimates of reserves at that time?

A Seven billion cubic feet.

Q So that the value of the reservoir on the basis of the present information is approximately 35 per cent of what you estimated a year ago?

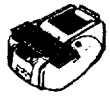
A Yes, sir, it is.

Q On the basis of the information you have obtained, in your opinion would it be economically feasible to drill an additional well in this reservoir?

A It appears not. It would not be feasible. The wells would cost approximately $520,000 and we're looking at gas, say if it sold for ten cents an MCF, have only $265,000 run. I'm not saying we're selling it for ten cents. Actually we're getting a little more than that, plus our distillate production.

Q On the basis of the addition dry hole and the pressure information, it would appear that you would probably have a one-well field.

A That would be my opinion.



Q And that this one well would drain the field?

A Yes, sir. In the event a second well was drilled in the field, well, then the economics on this particular well would no longer be satisfactory.

Q Do you have anything further that has developed during the year, Mr. Montgomery?

A I would just point out that our distillate gas-oil ratios have been increasing and we would anticipate that they will continue to increase. We were producing initially right at 16,000 to 1, and the latest information we have it's in the range of 22,000 to 1.

Q So that the total value of the recoverable distillate is dropping steadily?

A Yes, sir, and it will continue to drop till such a point as it reaches the evaporation stage and at that time it will be a slight increase. We can expect nothing but an increasing GOR which would probably run in the range of 80 to 100,000 to one, perhaps another 10 to 15 per cent decline in pressure in the reservoir.

Q In your opinion will the one well effectively drain 320 acres?

A We have every indication that it is a high productive well and there's good transmissibility so we will be able to drain this.

Q That is the evidence that was submitted at the original

hearing?

A That's correct.

Q Is there anything further you care to state, Mr. Montgomery?

A No, sir, not at this time.

MR. BRATTON: Mr. Examiner, we would move the evidence which was introduced in the original case be considered in connection with this application and not burden the Examiner with repeating that evidence other than the brief synopsis presented here. That concludes our direct evidence.

MR. UTZ: The evidence in the original case will be entered into the record of this case.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Montgomery, what are the pool limits at the present time, do you happen to know?

A I believe it's the North Half of that section.

MR. BRATTON: I believe that is correct.

MR. UTZ: North Half?

MR. BRATTON: It's exactly the North Half of the section.

Q As far as you know at this time, you don't intend to do any more drilling in the area?

A No, sir, we cannot justify drilling of an additional well. We feel this well will drain it and in the event a second

well is drained, that will even lower reserves far below what they are now.

Q Robinson Brothers owns the entire North Half?

A Yes, sir.

Q There's no royalty difference of any nature between the Northwest and Northeast Quarters?

A No, sir, they're all the same.

Q If this is only a one-well pool, then in the absence of gas proration--well, even with gas proration it wouldn't make any difference whether you had 160 or 320, would it?

A In the event we should lose the Northeast Quarter of the section because of the order written by the Commission, it's conceivable that someone might move into the pool and drain it and drill a well which could drastically reduce the economics payout of this well.

Q You mean drill over to the East?

A Yes.

Q At the Texas Company acreage?

A Yes. Of course, by the pool rules they could drill on that acreage you are referring to, but I'm referring to the Northeast Quarter of our North Half.

Q If you don't drill it, who would drill it?

A If anyone investigated it thoroughly, I'm sure they wouldn't but that isn't always the case.

Q You own the acreage, don't you?

A To date we do, yes, sir.

Q Well, will not your well hold that acreage?

A I'm not qualified, I haven't read the exact terms of the lease. I'm not qualified to answer that.

Q I'm just trying to figure out how anyone would move in and drill the Northeast Quarter of your acreage?

A I may be mistaken.

MR. BRATTON: Mr. Examiner, I believe what Mr. Montgomery is getting to, if the pool rules should be 160 acres, conceivably you could have a termination of the lease as to the Northeast Quarter. We would not anticipate it, but that is a possibility. Then as he said conceivably somebody with tax money and without full investigation might be talked into drilling a well on there, which would be an econonomic disaster for them and for Robinson Brothers. We believe that the one well will drain the acreage. That's probably about all that there will be drilled in there, but we certainly would feel that the one well will drain it and that it could and should be prorated or spaced on 320 acres.

Q (By Mr. Utz) When was the first production from this well?

A March 1961.

Q How much gas has the well produced to date?

A To date it's produced approximately 413,000 MCF.

Q That was what, to what time?

A December 8, 1961.

Q The date you took the last pressure?

A Yes. I might add that for the month of November, that we do not have the gas figures yest from El Paso and I have estimated the volume for November and the first eight days in December at the rate that we have been producing it, which was slightly in excess of one million a day.

MR. UTZ: Any other questions of the witness?

MR. MORRIS: Yes.

BY MR. MORRIS:

Q Is it your proposal that the rules that have been in effect in this pool for the last year or so as promulgated by Commission Order R-1839 be made permanent?

A Yes, we do. However, we also plan to take bottom hole pressures every six months throughout the life of this well. That information will always be available to the Commission if they so desire.

MR. BRATTON: Mr. Morris, we would suggest and we would hope that the Commission would make the rules permanent. If the Commission should feel that a further one-year extension is advisable, why, of course, that's within the Commission prerogative, and as Mr. Montgomery says, we are going to take further pressure tests straight along.

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MR. UTZ: It's pretty generally understood that a good amount of shut-in bottom hole pressure tests are not satisfactory isn't it?

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MR. UTZ: Are there any further questions?

(Witness excused.)

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STATE OF NEW MEXICO)
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IN WITNESS WHEREOF, I have affixed my hand and notarial seal this 11th day of December, 1961.

Ada Dearnley
COURT REPORTER-NOTARY PUBLIC

My commission expires:

June 19, 1963

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2131, heard by me on Dec. 11, 1961.

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BEFORE THE
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December 11, 1961

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(Witness sworn.)

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Q That would be shown on what was marked as Exhibit No. 2

in the hearing. Was there a plat on that exhibit which showed the Robinson Brothers well and the two dry holes to the North?

A Yes, sir, it did.

Q Since that time has there been added a dry hole in the South half of Section 22 directly south of the Robinson Brothers well?

A There has Trice Production drilled a well 1650 from the South and 1980 from the West of that same section. That well was cored throughout its entire interval. I have a log showing the sample description and it indicated that the whole section was dense. It had shaled out. There was one thin sand in the upper portion of it. However, it was going to be non-commercial and the well has since been plugged and abandoned.

Q So this has confirmed your testimony that this is a meandering type of reservoir and apparently is blocked off to the North, West and South and could only possibly extend or meander to the East?

A Yes, sir, or around the well bores.

Q Now, what information have you developed since the hearing a year ago, Mr. Montgomery?

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(Witness excused.)

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IN WITNESS WHEREOF, I have affixed my hand and notarial seal this 11th day of December, 1961.

Ada Dearnley
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My commission expires:

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Examiner
New Mexico Oil Conservation Commission