(Afternoon session, hearing before the Oil Conservation Commission, October 28, 1948.)

COMMISSIONER SPURRIER: Gentlemen, the Commission is again in session. Mr. Graham, will you read the call for the seventh and last case?

(Reads the notice of publication in Case 163.)

MR. SETH: Gentlemen, this is an application of Stanolind Oil and Gas Company involving the Blanco field or pool in San Juan County. The underlying idea is that inasmuch as the pool is in its very early stages of development that proper spacing rules and proper well patterns should be started so that--subject, of course, to changes--as further development may dictate, and always with the idea that possibly there might be a unitization of the field, and thereby unnecessary wells might be avoided. I made a mistake in preparing the petition in that paragraph No. 1 the tolerance should be 330 feet from the center of the 160 instead of 660 feet. I didn't know much about it and I put in the wrong figures. We would like to have Mr. Umbach sworn.

PAUL UMBACH, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. SETH:

Q. Please state your name.

A. Paul Umbach.

Q. What is your profession, Mr. Umbach?

A. District geologist for Stanolind Oil and Gas Company.

Q. And where are you located?

A. Albuquerque, New Mexico.

Q. You have testified before the Commission before, have you

A. I have.

MR. SETH: I will omit the qualifications.

COMMISSIONER SPURRIER: Surely.

Q. Are you familiar with the Blanco pool, so-called, in San Juan County, New Mexico?

A. I am familiar with it, yes, so far as it is developed.

Q. And that is, I believe up to the present time at least, a gas field?

A. It is.

Q. Now, have you a map--which I would like to have marked as Exhibit 1. What does that indicate, Mr. Umbach?

A. This exhibit indicates the--an outline of that--of the Blanco area, in which we think has possibilities of containing production.

Q. The boundaries of the field or pool have never been fixed by the Commission?

A. That's right.

Q. This map indicates your views as to the outline of the probably productive area?

A. Of course, we don't know the outline of the productive area, but as best we can tell right now that would be the outline that we would propose for unitization.

Q. That includes lands in Townships 29 and 30 North and 9 and 10 west?

A. That's right. 29 and 30 north, 9 and 10 west.

Q. Now, the east and west boundaries of the area you have shown here are indicated by wells drilled outside the area ....

A. .... outside the area ....

Q. .... and that were not ....

A. .... commercial wells.

Q. The north and south lines, are they just ....

A. They are not defined.

Q. The north and south lines, ...

A. .... Northwest and south lines, that is what you mean. It is just a matter of extending the area approximately two miles or two and a half miles from that which is proven productive.

Q. Now, the coloration on the area you have outlined here. What does that indicate?

A. The brown indicates the patented acreage. The red indicates the state acreage, and the blue indicates government land.

Q. The area which predominates is government land?

A. Yes.

MR. SETH: We offer Exhibit 1 in evidence.

Q. I hand you Exhibit 2. What does that indicate, the map?

A. Exhibit 2 indicates the structural--indicates the structure of the Blanco area, as defined by subsurface data on the top of the Cliffhouse on top of the pay.

Q. That is, the contour lines run along the top of the pay as indicated?

A. That's right, and substrata.

MR. SETH: We offer Exhibit 2 in evidence. We will have him testify about it further.

Q. I hand you Exhibit 3. What does that indicate?

A. It is a similar outline as Exhibit 1. The same outline indicating the lease ownership in the area.

Q. Now, the white places, what are they?

A. Small individuals--small individual patented areas. Government small ownerships which we did not define. It is too small to be subdivided.

Q. I hand you Exhibit 4 and ask you what it is?

A. This is a cross-section of the wells drilled in the Blanco area from Florance Pierce-Federal to Stanolind No. B-1 Elliott indicating the top of the formations and the pay horizons.

Q. It is the log of the wells?

A. That's right, the electric logs.

Q. Mr. Umbach, you are familiar with the geology of that area, at least as far as it is disclosed?

A. I am.

Q. How many wells altogether have been drilled there?

A. The number of producing wells or how many wells on that particular area?

Q. Yes.

A. I believe within the area outlined to the Cliffhouse there are four wells.

Q. What is the name of the pay in the area?

A. It is the Cliffhouse pay and Point Lookout pay.

Q. At what depth ordinarily is the Cliffhouse pay found?

A. Approximately 4,200 feet.

Q. And the other one?

A. About 4,700 or 4,800 feet. About 4,800 feet.

Q. And are both pays productive? I mean in the wells that have been drilled?

A. No, they probably are productive. Not placed for production. Stanolind B-1 Elliott has only been tested to the casing in the Point Lookout. We have taken drill stem tests however in the Cliffhouse.

Q. Which is the lower one?

A. Point Lookout.

Q. Is the gas from each formation substantially the same?

A. As far as we can tell.

Q. You know the pressures in each one? Have you any data?

A. I haven't any data available. It is approximately 1,300. I do not have the exact data with me here.

Q. From the surface geology and what is shown in these wells, what is your view as to the entire area shown on these maps, Exhibits 1 particularly, as being substantially the same pool?

A. We have been unable through our work to define a structure in the area.

Q. What I am driving at is, the San Juan river runs through the area. Does that divide it into two parts underground, in your opinion?

A. It has no bearing on it whatever.

Q. What is there? A dome, or what is the structure?

A. It is a monocline, with no closed structure. In other words, it is a post stratigraphic trap due to cementation of the sands; the best we can tell at this time.

Q. Is there any disclosure on the surface of any importance?

A. Our surveys which we have correspond with the subsurface data which we presented to the Commission on the exhibit.

Q. Where is the Stanolind Oil and Gas Company well that you spoke of? Is that north or south of the San Juan?

A. South.

Q. And the Florance wells?

A. North of the San Juan River.

Q. Are any of them hooked ontc any pipe line?

A. No, they are not.

Q. All closed in?

A. All closed in, with the exception of the well which now

furnishes Aztec, which is in Section 29. I believe it has been furnishing Aztec since 1929. It is an old well.

Q. Can you, by taking this exhibit or from any other source, give the thickness of the various sections involved here, Mr. Umbach?

A. The thickness of the sections from the top to the bottom?

Q. Yes, and particularly the pay.

A. Most of the wells in this particular area were spudded about on contact with the Fuerco-Torrejon-Wasatch. The wells will have to be drilled to approximately 1,500 feet to penetrate the Fuerco-Torrejon sedimentation, including the Ojo Alamo at the base. Kirtland has approximately 700 feet. Fruitland approximately 350. Pictured Cliffs would be approximately 75 feet. The Lewis shale would be approximately 1,700 feet. And the Cliffhouse approximately 150 feet. And the Menefee approximately 450 feet. And the Point Lookout approximately 150 feet. The two pays, the Cliffhouse, which has a total sand and shale thickness of 150 feet, and the Point Lookout has a sand and shale thickness of approximately 150 feet.

A. And they are, in your opinion, as far as present development indicates, entirely separate pays?

A. They are very probably separate, yes, due to the 450 feet of Menefee between them.

MR. SETH: That is all.

COMMISSIONER SPURRIER: Is there anyone who now wishes to cross-examine the witness? Very well, the witness is excused.

JOSEPH B. JENKINS, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. SETH:

Q. State your name, please.

A. Joseph B. Jenkins.

Q. What is your profession?

A. Petroleum engineer.

Q. By whom employed?

A. Stanolind Oil and Gas Company.

Q. And how many years have you been employed by them?

A. Since September, 1935.

Q. What professional training do you have?

A. B.S. in mechanical engineering.

Q. Where?

A. New Mexico A. & M.

Q. Are you familiar with this Blanco structure in San Juan County, New Mexico?

A. Yes, sir.

Q. And have you made an examination of the locations of the various wells, and the general situation in that area so far as present development permits?

A. Yes, sir.

Q. Have you also made a study of the testimony given by Mr. Michaels in the Kutz Canyon hearing, Case No. 126, on the well costs and similar matters?

A. Yes, sir.

Q. Have you made up a tabulation showing the drilling costs, depths, and well potentials, and the like, of the wells on the Blanco pool?

A. Yes, sir.

Q. Which wells on Blanco did you take into consideration?

A. Florance No. 1 Pierce Federal, Florance-Mansfield No. 2, And Stanolind-Elliott B-1.

Q. They are all wells completed but not hooked up for pro-

duction?

A. That is correct, sir.

Q. Now, take the average depth in the Blanco structure. How deep would a well have to be drilled to pruduce from both pays? You are familiar with the two pays Mr. Umbach testified about?

A. Yes, sir.

Q. How deep would a well have to go to produce both pays?

A. To adequately test both pays, we believe that we would have to go to approximately 5,000 or 5,100 feet.

Q. And on this Exhibit 5, is that the first figure represented there under the heading of "Depth"?

A. That is correct. The column which is directly underneath the word "Blanco" represents the depth in feet for the wells--is our well, which is drilled on the Blanco area.

Q. And in the other column "Kutz", what does that mean?

A. The column there represents in the length of the dark section at 2,100 feet an approximate average total depth for the wells in the Kutz Canyon field.

Q. The wells producing in that field average about 2,100 feet in depth?

A. Yes, sir.

Q. Take the next column "Drilling Cost". Do you know what the Stanolind well cost?

A. Our latest figures on the N. L. Elliott B-1 indicate that the cost will be slightly in excess of $110,000.00.

Q. Is that a figure?

A. That is represented by the overall length of the column underneath the word "Blanco".

Q. Under "Drilling Cost".

A. Which is shown there in thousands of dollars.

Q. Why did that break above 80,000 dollars?

A. The break at approximately 80,000 dollars represents our estimate of what it would cost to drill, complete, and adequately test for full reservoir information a well in the Blanco field or pool.

Q. In other words, your first well cost more than you would anticipate other wells would?

A. Yes, sir, and it is quite possible that as additional experience is gained in drilling the wells that a considerable difference would of course be represented between what our initial expenditures amounted to.

Q. What was the average cost as shown by the testimony referred to in Kutz Canyon?

A. The present average cost of Kutz Canyon wells is approximately 20,000 dollars.

Q. Taking the next column "Development Cost" in dollars per acre unit, that is similarly a pictorial representation of what it would cost to develop a well in the Blanco--or a unit rather--in the Blanco field under three examples of density.

A. Yes, for example, the first column, which is labeled "160" at the top, and extends down to a point of 690, represents the development costs of a 110,000 dollar well if one well were drilled on 160 acres.

Q. It represents the cost per acre?

A. That is correct. It is, in effect then, a 110,000 dollar divided by 160 acres. The broken line in this series of columns under this one particular heading represents a similar calculation involving an estimated well cost of 80,000 dollars

divided by 160 acres in one instance, 320 acres in the next instance, and 640 acres in the next instance. It therefore portrays that if development in the Blanco field is carried on with one well to 160 acres, and the average well cost for purposes of illustration is 80,000 dollars, then the development cost per acre would be 500 dollars. Similarly, if the size of the drilling unit was 320 acres, the development cost per acre in the unit would be 250 dollars. A similar calculation gives us 125 dollars per acre if only one well is drilled on 640 acres.

Q. In Kutz Canyon, based on 160-acre spacing and an average cost of 20,000 dollars per well, what is the cost, development cost, per acre that ....

A. That would be 125 dollars per acre.

Q. Now, well potentials, the next column, what does that mean?

A. The block graph which is presented under this caption is labeled potential per well in millions of cu. ft. per day, and under the heading of"Blanco " we have illustrated there the available data for three different wells. The longest section of that staggered column there indicates that a potential of 3,300,000 cu. ft. per day was obtained by means of a back pressure test taken in accordance with the U.S. Bureau of Mines recommended standard pressure. The other two steps under the main heading of the graph for "Blanco " there represent a similar type test taken at the two Florance wells. Under the heading for Kutz, the data is taken from Bulletin 18, entitled the Oil and Gas Resources of New Mexico, 2d Edition, published in 1942. I believe the author was Robert L. Bates, geologist of the State Bureau of Mines and

Mineral Resources. There is no information indicated in the bulletin as to the exact manner in which those potentials were obtained. The bulletin indicates that the potentials varied from a low of 400,000 cu. ft. per day to a high of 4,000,000 cu. ft. per day.

Q. Now, taking the next colum "Deliverability".

A. The next block under the caption "Deliverability" by M. C.F. per day represents under the heading Blanco the calculated deliverability of the two wells on which we have the most reliable data in the Blanco field, based on the Bureau of Mines type back pressure test, and on assumed delivery pressures. The assumed delivery pressure was 625 pounds per day.

Q. You mean per inch?

A. P.S.I. That is represented under the block heading under deliverability of 1,100,000 cu. ft. per day deliverability at the N. L. Elliott B-1, and a similar type test performed at Florance Pierce-Federal No. 1 well, indicating that the well should deliver against a similar line pressure 1,000,000 cu. ft. of gas per day. The hachured section of the graph immediately below is an estimate of what the deliverability of those two wells might be if the back pressure against which they were operating was in the neighborhood of that which is encountered at Kutz Canyon-Fulcher Basin. However, that hachured section has to be classified by further condition in that due to the absence of a sufficient number of accurately drilled plates for the critical prover in addition to those normally furnished with that, these points, as represented by the hachured sections are extrapolations. Under the Kutz Canyon block-headed up deliverability there is

shown there three steps. The step of shallowest indication there of approximately 250,000 cu. ft. per day is an average taken from the total production as reflected by the June reports of the Lea County Engineering Committee divided by the total number of wells which were indicated to be producing during that month; and similarly, the second step is an identical calculation performed from the same data sources for the month January 1948. And the longest step there shown under Kutz Canyon represents an estimate that the wells might deliver one-fourth of the maximum potential. In other words, the longest section on there is what the best well in Kutz Canyon might be reasonably expected to produce against the normal back pressure of the line.

Q. The next column "Delivery Pressure", is that what you referred to awhile ago?

A. Yes, sir. I believe that probably only one clarifying remark needs to be made with regard to the Kutz section. And that is that we have shown there a figure for summer pressure and one for a winter pressure. That data is taken from, I believe, bulletin 18, which indicated that the average winter delivery pressures were 200 P.S.I., and the average summer pressures were 350 P.S.I.

Q. Down at the bottom under the heading of "Porosity %", from what is that information obtained?

A. These a re weighted averages of the porosity of the cores that were obtained at the N. L. Elliott No. 1 well in the Mesaverde section. The second step, the one that is farthest to the left and also the longest one, indicates that the weighted average porosity of the Point Lookout sand was approximately 11 per cent of that section in which cores were

recovered. The step indicates a similar figure for the Cliffhouse. For purposes of comparison, we have shown what the weighted average porosity was for the Pictured Cliffs sand in the N. L. Elliott No. 1, which as shown from this graph was approximately seven per cent. The data as listed there under Kutz and indicated to be 20 per cent is from the testimony of Mr. Earl Nichols in respect to Case No. 126, at which time it was indicated that the porosity was in the neighborhood of 20 per cent.

Q. Now, the next.

A. From the same cores which were obtained from the N. L. Elliott B-1 well, the weighted average connate water percentage for Point Lookout was found to be approximately 22. And for the Cliffhouse approximately 27. For purposes of comparison, the Pictured Cliffs data for the N. L. Elliott B-1 well is also shown there, and it was found to be approximately 30 per cent. I believe that the tests that we took in the Elliott B-1 in the Pictured Cliffs as well as the core data indicated that the particular sand, at least in that particular well, was probably non-commercial. From the same testimony in Case No. 126, it was indicated that the connate water at Kutz Canyon was in the neighborhood of 20 per cent.

Q. Now, next take up the column "Pay Thickness".

A. As in the previous examples, we have shown on the left a section for Blanco and on the right one for Kutz. The data for Blanco is taken from our core data in the N. L. Elliott B-1. And the data under Kutz is taken from the testimony in Case No. 126. Under the subheading of Blanco, we have attempted to indicate the gross pay as well as the net pay of the two sands, Point Lookout and Cliffhouse. It is believed

that there is approximately 42 to 43 per cent net pay in the Cliffhouse. And in the Point Lookout 53 per cent of the section which was cored was indicated to be net pay as based on the analyses of the cores which were recovered.

Q. What was the entire footage that you drilled and cored?

A. The over-all section of the Mesaverde was approximately 850 feet. Of that we cored 349 feet.

MR. MORRELL: Would you mind repeating both the gross net of the Point Lookout and Cliffhouse?

A. The net pay of the Cliffhouse was calculated to be approximately 42 per cent. Forty-two feet, pardon me. And of the Point Lockout, approximately 53 feet. We cored a total of 349 feet. We were not successful in our attempts to core the entire Point Look section.

Q. Why?

A. At approximately 4,905 to between there and 4,910--if I am incorrect on that, Mr. Umbach can make a correct statement--but it is approximately in there--we lost so much circulation due to reservoir conditions that we were unable to proceed with the rotary tools without undue hazards. At that point, it was therefore decided that in order to complete the well it would be necessary to cease rotary drilling and coring operations and convert to cable tools. We lost approximately 4,000 barrels of oil-emulsion-type mud in the interval from approximately 4,905 to 4,910 feet, which we believe indicated that in that lens at least an extremely high permeability and porosity or combination of both was present. And after we converted to cable tools for some considerable period of time we recovered large quantities of the mud back into the bore hole which had previously been lost in this interval.

Q. Now, the Kutz pay thickness, what data do you have on that?

A. That is based on the similar--these previously mentioned sources--and it has indicated that the net pay there was in the neighborhood of 40 feet and the gross at 100 feet.

Q. Now, the virgin or original pressure, Mr. Jenkins?

A. In the Blanco field we have found from the tests which we have taken that the virgin bottomhole pressure is in the neighborhood of 1,370 P.S.I.A. That is further substantiated, we believe, by the fact that the back pressure data tests plotted into a straight line function. Which indicated that the figure that we had obtained for the shut-in pressure at the Elliott B-1 was reasonably correct. In the Kutz Canyon the available literature indicates that the virgin bottomhole pressure there was slightly less than 600 P.S.I.A. We do not have any tests of our own to substantiate that data, and it may be very difficult to know positively just what the true formation virgin pressures were in Kutz Canyon since it was drilled so many years ago. And the accuracy of some of the tests and some of the equipment has been questioned.

Q. Now, the permeability.

A. Under Blanco we have shown a thin line there which shows that the permeability weighted average of that which we cored and recovered the cores was in the neighborhood of 1. We have estimated, based on experience in other fields and regions where we have had undue troubles due to lost circulation, that the permeability of at least one section in the Point Lookout is probably in excess of 20,000. For Kutz Canyon the data there is taken from the Case No. 126, which represented, I believe, that the miminum permeability was approximately 5 per cent,

and the maximum of any one section which was cored and recovered and analyzed was approximately 340.

Q. Now the estimated field area in acres?

A. For Blanco, as Mr. Umbach has testified, it is tentatively assumed that the field may cover in the neighborhood of 30,000 acres. And previously mentioned sources are quoted for the field, which is represented there for Kutz Canyon-Fulcher Basin being in the neighborhood of 15,000.

Q. Mr. Jenkins, you wouldn't regard the Blanco field as other than in the very earliest stages of development, would you?

A. No, sir.

Q. And from these figures--and we offer in evidence at this time this Exhibit 5--and your testimony--will you state to the Commission your views as to the advisability of 640-acre spacing at the initiation, at least, of the development?

A. As this chart has represented, we have a fair amount of data under one well only. We do not pretend to assume or to declare that the data for that one well is representative of the entire producing structure. I believe that anyone would hesitate to attempt to estimate the recovery from any field or any reservoir in which no field limits had been established, and in which no representative cores or core data had been obtained so that some reasonable basis for the void space calculations could be assumed. It is our idea that knowing as little as we do about the Blanco reservoir, that it would be most advantageous to everyone concerned to initially develop the field in such a manner so that in the event the initial spacing pattern wasn't found to be the most desirable one, that it could be ultimate ly adjusted without disrupting the spacing pattern or creating an undue number of unorthodox

locations and exceptions.

Q. Your idea is that if the 640-acre spacing should be adopted that as further developments might indicate it could be altered. And your idea of the spacing pattern, that is, one well in the NE¼ would enable a reduction to, say, 320 acres, which could be made without any confusion or unorthodox well drilling?

A. That is correct.

Q. There is nothing peculiarly important as to the first well being located in the NE¼ of the section, is there? It could be just as well in the NW or SW?

A. That is correct.

Q. But your idea is that one well to each 640 and all in the E½ would enable the W½ to be similarly developed when the future development so indicated?

A. That's right.

Q. Now, is there any likelihood, in your opinion, of an effort being made to unitize the field?

A. To the best of my knowledge, efforts are being made to bring a unitization of the Blanco reservoir to an ultimately satisfactory conclusion. However, I cannot positively state at this time just how far those steps have progressed.

Q. Would this uniform spacing pattern be of any value if the field should ultimately be unitized?

A. It would probably, I believe, permit earlier exploitation of the reservoir to its limits.

Q. It would enable the boundaries of the pay to be developed more rapidly?

A. And sooner. And it could very easily conserve the natural resources expended in the drilling of unnecessary wells in

the event it was found that one well would drain adequately 640 acres, or more or less.

Q. It would arrange the well pattern so that if additional wells were determined to be necessary, they would be more likely to be drilled?

A. And they could be drilled in a uniform pattern to some other density.

Q. Now, in connection with this petition, it was suggested that the initial well be in the center of the NE¼ of each section. You stated, I believe, that it might just as well be in another quarter of the section so long as the pattern was uniform?

A. That is correct, sir.

Q. And the tolerance stated in the petition as within 660 feet of the center of the quarter section should be 330 feet?

A. That is actually what was meant. A 330 feet radius around the center of that particular quarter section. That tolerance being desirable because of the rough nature of the topography.

COMMISSIONER SPURRIER: As given, shall the record show that to amend the application?

MR. SETH: Please. Now, in our petition we have recommended that surface pipe should be set through the shallow water beds, with nothing less than 250 feet, with cement circulating to the surface. Tell us what your views are as to that, Mr. Jenkins.

A. In this region, it is believed desirable to protect the fresh water beds, and similarly, the rights of the land owners. And we believe it to be good operating practice to have a reasonably secure section of surface pipe in what can

be probably called, even at this date, more or less a wildcat area; in that we do not know just how much gas might be encountered in that particular well. And by means of, by having a good surface string we would have a better opportunity to control the well.

Q. Are the shallow water beds there generally fresh water?

A. I understand that they are. I haven't had a drink--I had a drink of water from one sand. It was all right. I don't know about the rest of them.

Q. But your idea is to absolutely protect that water from contamination so far as possible?

A. We believe it is desirable from both of those standpoints.

Q. Now, the production string, the setting of that?

A. In this field, it is believed that we can dispense with an intermediate string, and that only a surface string and a production string are necessary for the adequate control of the wells, and for the protection of all the commercial beds and water signs. It has been found that a minimum figure for the amount of cement to be set in a production string is a desirable feature in rules for a field so that there will be less likelihood of a well being cased with an insufficient quantity of cement to prevent charging of upper beds from the producing gas sands or oil sands. Therefore, we have suggested in this application that a ninimum of 100 sacks of cement be used in connection with the setting of that production string.

Q. You think that will be sufficient?

A. It is our normal practice. Stanolind's normal practice. Principally in the interests of insurance to use a greater quantity of cement than that which is indicated in the petition.

Q. Now, the well probably will produce from the two different pays. What is your recommendation with reference to the pressure tests or the separation of the pays?

A. It is believed desirable in the interests of obtaining more and better reservoir data that adequate tests be made of the productive ability of the individual completed wells. Further, in the interests of the conservation of gas, it is believed desirable that in lieu of wide open potential tests, which are commonly known to waste considerable quantitites of gas, that instead the back-pressure-type tests, which have been developed by the Bureau of Mines and outlined in considerable detail in their monograph published by the Department of the Interior, Bureau of Mines, and entitled "Back Pressure Data on Natural Gas wells and Their application to Production Practices"; as indicated in our petition, it is the intent of this monograph, in which you obtained a sufficient number of these back pressure tests on any individual well, so that its actual or its absolute open flow can be calculated without the necessity of wasting large potentials of gas, which are normally wasted in attempting to stabilize wells at wide open flow. For that reason, as well as to furnish information which will be of considerable value to any commercial purchaser of the gas, either pipe line, domestic or manufacturing, that in the process of developing the field, this data should be obtained. It is believed desirable from a standpoint of further investigation, to which we have previously referred, that these back pressure tests should be a requirement of wells in the field.

Q. Do you believe that separate tests of that nature should be taken for each pay?

A. We believe it will assist the operators as well as the U. S. Geological Survey and the Oil Conservation Commission in determining to a greater certainty than is possible now whether or not the two pays should be produced separately or be allowed to be commingled.

Q. Now, do you think that they should be retaken at various intervals?

A. It has been found advantageous, according to the authors of the monograph, to repeat these tests, usually annually, in order that the deliverability or productivity of any given reservoir could be more accurately ascertained as that data was needed. And in some states that is a requirement; that the tests be taken annually.

Q. Mr. Jenkins, have you anything futher that you care to add that I may have overlooked?

A. I wonder if the Commission would be interested in receiving as evidence this back pressure data which was obtained on the Elliott B-1?

MR. SETH: We offer in evidence a photostatic copy of the gas test on that well B-1 in the Blanco area.

Q. This you know to be correct?

A. To the best of my knowledge that is correct.

MR. McCORMICK: Do you have a market for this gas, Mr. Jenkins?

A. At the moment, we do not have.

MR. McCORMICK: How close is the closest gas pipe line?

A. I am having to guess on this point. I would say approximately ten miles just by looking at the map. I do not know how much of a diverse route a pipe line would have to take in order to encircle surface obstructions.

MR. BARNES: Mr. Jenkins, under present economic conditions,

if we assume a good producing well, approximately how long will it take a well to repay the original investment in this area? Completed to the Mesaverde?

A. I cannot answer your question because we do not have any data on which to estimate a return price for the gas.

MR. BARNES: Do you have an idea about what the abandonment pressure would be in that field?

A. That question could only be answered by the people who put in the pipe line or a gasoline plant. By that, I mean that the circumstances under which those plants or pipe lines are operated determine, are the principal determining factor, as well as the recovery, as to what the abandonment pressure of the formation would be.

MR. BARNES: In other words, the abandonment pressure at the present time and the time of the return are still imponderables that increase the risk of drilling in the field. Is that right?

A. That's right.

COMMISSIONER SPURLIER: Are there any further questions of the witness?

MR. SCHULTZ: Mr. Jenkins, is the theory behind this 640-acre spacing that you want with a minimum amount of effort to determine the limit of the producing area?

A. That is part of the applicant's petition.

MR. SCHULTZ: I believe I missed the other part. Would you explain again the size of that and the reasons?

A. Yes. In the event that the data as it is eventually accumulated indicates that one well will drain 640 acres adequately, then of course, there would be no reason for any additional density development. Atthe same time, the

tentative spacing which we have asked for would permit a greater density development in the event the accumulated data indicates that such additional drilling would be warranted. I do not believe that any one of us now can say that this field should be drilled on the same density as the Hugoton gas field, which is principally one well to a section, nor can we say conversely that it should be one well to 160 acres, because we have a paucity of data.

MR. SCHULTZ: Would you agree that neight Stanolind nor the other operators have data at this time for proper spacing regulations? Is that right?

A. I don't like the wording of your question. Would you mind clarifying that a bit?

MR. SCHULTZ: Well, did you testify just now that you don't have the adequate data to ask for a permanent spacing?

A. That is correct. We are not asking for a permanent spacing.

MR. SCHULTZ: If the spacing program, other than a 640,were decided upon by the Commission, there is nothing that would keep the Stanolind from stepping out and determining the limits of the producing area by extension wells. Is that right?

A. There is nothing physically in the road. However, we are not sufficiently impressed with the economics of this field that we would--that we are anxious to go into an extensive development program until such time as we know more about it.

MR. SCHULTZ: Where did you lose mud? In what zone?

A. The principal loss was in the Point Lookout.

Q. Would you say that that had anything to do with the net

open flow potential of that well?

A. We do not believe so, because we recovered a very large quantity of that mud in our continued progress with cable tools; by baling the hole and scraping it. And in addition, the tests that were taken after--as the well was completed, did not indicate that the hole was filling with mud any more.

MR. SCHULTZ: How much mud did you lose in it originally?

A. In the neighborhood of 4,000 barrels.

MR. SCHULTZ: How much did you recover approximately?

A. Approximately a good--a grand total, we believe, in excess of 3,000 barrels. Now, part of that we know was lost behind the pipe because we ran the production string with the rotary tools. The hole, of course, is still loaded with mud. It was necessary to set a cement plug in the formation above this lost circulation point in order to have a mud column during the period of running the casing.

MR. SCHULTZ: Don't you feel--let me ask it this way. Do you feel that mud in the formation would restrict the flow of gas into the bore hole?

A. It is normally figured that that is true.

Q. If you lost 1,000 barrels--that is what you figure you didn't recover--don't you feel that will substantially reduce the open flow capacity of that well?

A. The thousand figure is a rough approximation.

MR. SCHULTZ: I appreciate that.

A. In the second place, there is some considerable portion of that which is behind the pipe. How much is back there, I don't know. How much of that variation is due to an indeterminable error because of carrying across the country and not being gauged in tanks, and so forth; those are

factors which make it almost impossible for me to say how much is in there.

MR. SCHULTZ: Do you think that any mud in the formation of a low pressure gas area would restrict the open flow and deliverability of the well?

A. I believe that that is the normal condition. How much it affects that, however, I don't know that anyone--at least, I wouldn't feel free to estimate it.

MR. SCHULTZ: Would you drill another well in the area the way you did this Elliott B-1?

A. I do not believe that we would.

MR. SCHULTZ: Do you believe if you completed the well with cable tools it would increase the open flow considerably?

A. We have no concrete data on which to base such an assumption. As I understand it, the only well which was cable tooled to the Mesaverde was apparently in a poor section of the field. I do not know for sure about that. In other words, I am not quoting from my own knowledge on that. So, if that is true, we only have one cable tool completion on which to base some sort of an estimate. Perhaps the operator who drilled the well could make a statement to that effect. I am not prepared to.

MR. SCHULTZ: Mr. Jenkins, do you know anything about the cost of drilling the Florance wells?

A. No, I do not. I imagine that the Florance people could testify as to that.

MR. SCHULTZ: That is all I have.

MR. MODRALL: Representing the Brookhaven Oil Company. Mr. Jenkins, you are familiar in a general way with the ownership of the mineral rights in this proposed area that is repre-

sented on the plats that you have presented?

A. In a general way, yes, sir.

MR. MODRALL: The area down through the center along toward the San Juan River is indicated on your plats as patented land? In brown?

A. This map here?

MR. MODRALL: Yes, that is what I had referred to. The brown coloring is patented land?

A. That represents patented land.

MR. MODRALL: And that area is held generally in comparatively small blocks as far as mineral interests are concerned?

A. If you will recall, I did not testify on the preparation of this map.

MR. SETH: Mr. Umbach did.

A. To the best of my knowledge, what you say is true.

MR. MODRALL: But you are familiar in a general way with the ownership in through there?

A. Yes.

MR. MODRALL: And the pink area is state-owned lands?

A. Yes.

MR. MODRALL: I think that is all, Mr. Jenkins, you can lay the map down. You are also familiar with the fact that state-owned land, as far as state leases are concerned, are held in comparatively small blocks of 40 and 80 acres?

A. That is what I understand.

MR. MODRALL: If the Commission should adopt this proposed 640-acre spacing, how do you think that would affect the holders of these small acreages as far as developing their holdings?

A. They are permitted under a statute of the State of New

Mexico to pool their lands and their interests until they have a sufficient amount of acreage to make up the minimum size drilling unit as established by the Commission.

MR. MODRALL: Isn't it a fact, Mr. Jenkins, that where you have anywhere from six to ten ownership, or possibly more, in a drilling unit that from a practical standpoint it greatly increases the difficulty of getting such a drilling unit together and a unitization plan on that unit?

A. Well, that is an obvious question there. Any time you have to consult with more than yourself on whether you want to do this or not do this you have more difficulty than if you are the sole possessor of that piece of property.

MR. MODRALL: That would obviously increase the difficulty of any of the small owners of mineral interests in there in developing their own property, would it not?

A. Well, to some small extent, I imagine it would.

MR. MODRALL: And to what extent you are not prepared to say?

A. That is correct.

MR. MODRALL: But it obviously would facilitate the development of large acreages like Stanolind's, whereas it would make it more difficult the development of acreages held in small leases, would it not?

A. It if please the Commission, I would like to display on the map here--if you will note the yellow color on here, not the orange but the yellow, represents Stanolind's acreage. You can see on that that we only have a total of five solid blocks about which we would not have to consult with anybody else if a 640-acre drilling unit was adopted. We are in a better position than anybody else would be as far as having difficulty with royalty owners or other lease owners to

communitize with other operators to form a drilling unit.

MR. MODRALL: If the spacing requirement for the area was adopted as proposed on your exhibits, Mr. Jenkins, how would you suggest that they handle some of these areas where you haven't followed the section lines necessarily? You have a split down through some of the sections, have you not?

A. That is correct. The tentative boundaries--and recall that they are tentative boundaries--do run down through the centers of some sections. There is no reason why those boundaries shouldn't be either increased or decreased to follow some section line, or, similarly, if it is felt that these are the final field boundaries, that the owners of these two half sections here-- in this particular instance here, whoever owns this can drill a well without consulting anybody because it is a 640-acre job.

MR. MODRALL: You are specifying a location in a particular quarter section. They would obviously have to get a spacing ruling from the Commission in order to follow out your spacing plan if the Commission should adopt this spacing plan as you recommend it.

A. That is correct. We do not intend to--in the event that somebody finds the N E¼ of a section to be an untenable location, they could, for example, switch to the SW¼ or some other system of alternatives, which perhaps could be incorporated in the Commission's initial order, or, on the other hand, it could be handled by means of a hardship case hearing or unorthodox location hearing.

MR. MODRALL: Mr. Jenkins, I think you testified on direct examination that you believed that there was some talk of a plan to unitize the proposed area here in its entirety.

A. I said that I believed that was my understanding, that we were in the process of attempting to push steps towards final unitization.

MR. MODRALL: Isn't it a fact that once a unitization plan had been adopted for the area, then it would be--the interests of all owners would be better preserved to have a spacing order entered by the Commission after that was done rather than before?

A. The difficulty in waiting for the unitization is that since there is some small portion of owners scattered through there which have not been located nor leased to operators, that in the interim period before those owners could be contacted for unitization, that a considerable number of wells could very conceivably be drilled on a haphazard spacing arrangement which might ultimately be found not to be to the best interests of all concerned.

MR. MODRALL: On the other hand, holding up development, or possible development, by small owners would be postponed if the Commission adopted the 640 spacing pattern at the present time, would it not?

A. Well, I don't understand why. I mean they would have no more difficulties than any other operator who might own, for example, 600 acres out of 640. And might have--would have to communitize a drilling site, a tract, in order to get a permit.

MR. MODRALL: But it is true, though, that the larger your spacing pattern the difficulty increases as a matter of degree in getting unitized drilling areas.

A. Yes.

MR. MODRALL: How did you arrive at the 640 spacing area you

are asking for?

A. There are 30,000 acres estimated to be in the productive area; the tentative number. That means, for example, if just one well is drilled on a section, that 50 wells would have to be drilled, entailing an outlay of somewhere between four and five million dollars before the field limits could be ascertained and adequate reservoir data similarly developed. Naturally, the greater the density of well drilling, the longer it would take to develop the field limits; and the greater amount of investment that would be required to initially cover the area. At the same time, you are confronted with a lack of a market, which has a tendency, well, to not encourage extension drilling.

MR. MODRALL: You don't think then that the field is going to be over-drilled until you would get a market, do you?

A. Well, I couldn't estimate what all the operators are going to do.

MR. MODRALL: There is going to be a potential market there or there is not going to be very many wells drilled.

A. I believe that is correct.

MR. MODRALL: You gave some figures, represented on this graph I think here, as to your potential production of the Blanco wells as compared to the Kutz Canyon wells. I think you were basing your figures of Blanco on the Elliott well.

A. Those potential figures were taken from tests at the Elliott and the Pierce No. 1.

MR. MODRALL: Which is on the Blanco structure.

A. Yes, sir.

MR. MODRALL: In working up your figures, did you attempt to, or could you give us a pretty fair estimate as to the recover-

able reserves per acre, or any way you care to, on the various spacings, 160, 320, 640? You gave some figures on development costs along that line.

A. I don't believe I am prepared at this time to testify along that line.

MR. MODRALL: You haven't made any figures on that?

A. I have, but I do not feel that I have conclusive information.

MR. MODRALL: Well, the figures you have made, would they or would they not indicate that you would have greater recoverable reserves on a 160-acre spacing, we will say?

A. Greater recoverable reserves on a 160-acre spacing?

MR. MODRALL: If you had it on 160 rather than on 640?

A. I am not sure that I got your question just right, but let me say this. That in the absence of any interference tests, or production decline data, that I myself would not want to make any estimates as to what the recovery comparison would be. I believe it, under the circumstances, to be too recent.

MR. MODRALL: You have definitely good quality sands there, pay sands. I think you testified 42 net in one pay and another one 53. That is considered a good character sand and good reserves, is it not?

A. Qualified, of course, by the degree of porosity, permeability, and connate water.

MR. MODRELL: And with that thickness of sands in this area, and the data that you do have, wouldn't you agree that probably you would recover a greater amount of gas with spacing less than 640?

A. No, I couldn't say yes and I couldn't say no at this time.

MR. MODRALL: Well, Mr. Jenkins, isn't it a fact that as little as is known about the Blanco area that the main object of getting a 640 spacing at this time is simply to save you a good deal of possible cost in development?

A. You have made a rather direct statement there ....

MR. MODRALL: .... well, I was just asking whether or not that is not the reason for the request for this spacing?

A. As I previously stated, we believe that it is desirable to first find out in once sense just how much money you have in the bank before we start loaning it out, so to speak. In this respect here, before we, or anyone else,would attempt large expenditures in this region, we would have to know just how good is the investment. Just how much return are we going to get on each dollar we put in.

MR. MODRALL: And you are not prepared to say at this time that your request for 640-acre spacing is necessary to prevent waste in that field are you?

A. The 640, as I said,.was a suggested drilling site size. Even that involves the drilling of 50 wells to adequately determine the extent of the reservoir without an undue amount of so-called semi-wildcatting. And it was felt that if a 640-acre drilling size unit was established, that there would be a tendency to do more gradual stepping out rather than a development of a more intensified nature around a semi-proven area.

MR. MODRALL: I think that is all.

MR. McLEAN: I believe you testified a minute ago that you estimated that the probable cost per well in the Blanco Field would be around $110,000.00?

A. No, sir. I testified that the cost in the N. L. Elliott

B-1 as of the last accounting had run to $110,000.00.

MR. McLEAN: And do you have reason to believe that your cost in drilling any future wells will be less than that?

A. We certainly think so and hope so.

MR. McLEAN: But you don't know?

A. Well, that is not until we have the experience.

MR. McLEAN: And I believe you also testified that you knew of no market at the present time for the gas.

A. That is correct, as far as I know we have no market.

MR. McLEAN: Well, do you know the approximate number of acres in which Stanolind has an interest in the minerals in this field?

A. No, I do not know that myself.

MR. McLEAN: Do you know approximately the percentage of the acreage in the field in which Stanolind has an interest in the oil and gas and other minerals? Do any of your maps show that? On any of your exhibits?

COMMISSIONER SPURRIER: Mr. McLean, Mr. Umbach is prepared to answer that.

MR. UMBACH: I am not prepared to give the exact figures. However, the plat there, if you want to take the time and add up the acreage ....

MR. McLEAN: Could you give us an approximation?

MR. UMBACH: No.

MR. McLEAN: Well, your company does own a very large amount of acreage as shown on the plat. You don't know what percentage of the field?

MR. UMBACH: I haven't figured it out. That is up to the land department.

MR. McLEAN: Mr. Jenkins, if there were tracts to be unitized

and a number of different owners of acreage in each unit, it would be necessary for all of those owners to agree upon the plan for developing that unit, isn't that right?

A. I would prefer to refer that question to the Commission's lawyer, who is more properly qualified to state along that line, if it please the Commission, because there is a statute covering that as I understand it.

COMMISSIONER SPURRIER: Mr. Graham, are you prepared to answer the gentleman's question?

MR. GRAHAM: We require a majority of the owners.

MR. McLEAN: A majority of the owners on an acreage basis?

MR. GRAHAM: Yes, sir.

MR. McLEAN: In other words, if one or more owners control 50 percent of one unit, then they would have the right to say whether or not that unit was ....

MR. GRAHAM: .... it is on an ownership basis. The individual can try to get as near 100 percent of the owners as possible. But if a single individual doesn't wish to get in, he doesn't have to come in.

MR. SETH: Isn't there a statute by which the Commission can cause the pooling of tracts of small units?

COMMISSIONER SPURRIER: It has been twice exercised, Judge.

MR. McLEAN: In the proposed development of the plan, Mr. Jenkins, isn't it true that Stanolind either owns all of a number of the units, or the majority of the acreage in a number of the proposed units?

A. We own all of the acreage in six units. And from the appearance of this plat here, we own slightly in excess of 50 percent of the acreage in perhaps nine units. That would be fourteen out of fifty, roughly.

MR. McLEAN: Now, you have fifty units set up there on your exhibit, but isn't it true that at the present time it isn't known whether the Blanco field covers that entire area?

A. Well, that is not certain.

MR. McLEAN: That is true, isn't it?

A. Yes.

MR. McLEAN: Isn't it also true that if one company controlling a number of drilling units did not deem it economically practicable to further develop a field, that that might seriously impede the development of that field?

A. In speaking in generalities, what you say is true, but it doesn't apply as I see it in this particular case because we are not the majority owner.

MR. McLEAN: But you are the majority owner of about fourteen or fifteen of those 640 acre proposed units? Isn't that right?

COMMISSIONER SPURRIER: Mr. McLean, I am just asking this because I don't know what you are driving at. Do you mean to say that fifteen wells could be drilled here and then you could stop and the limits of the pool would not be known, and yet you could just stop drilling?

MR. McLEAN: The point I was making was that if one company or person owns a large number of the proposed drilling units, and if that particular company or individual believes there is no market for the gas,and believes that the cost of drilling is very high, and believes that the ultimate recovery is very low, then maybe the field will not be developed. Whereas if there is some other persons who believe they can economically drill wells, they might be prevented from doing so because of the large 640-acre blocks.

COMMISSIONER SPURRIER: Mr. Morrell, doesn't your department require offset drilling until the limits of the field are determined within reason?

MR. MORRELL: That is true.

COMMISSIONER SPURRIER: Does that make any difference to what you are saying, Mr. McLean?

MR. McLEAN: That is true to some extent. But isn't this true, Mr. Morrell? In order for an offset well to be drilled, if you had a 640-acre unit with a number of different owners, it would be necessary to get a substantial percentage of those owners to agree upon some method of development and who would be the operator and how to do it.

COMMISSIONER SPURRIER: Let's go one step farther. Mr. Morrell, they either drill the well or you force the payment of compensatory royalty without regard to who the owners are. I am not trying to make a point in favor of anybody. I am trying to show--what percent is Federal, Mr. Morrell?

MR. MORRELL: Roughly 85 per cent.

COMMISSIONER SPURRIER: You said drill three or four wells and stop.

MR. SCHULTZ: Do you require offset drilling where Government acreage is offset?

MR. MORRELL: That is a point I want to qualify. In this particular area the royalty rate to the United States is the same, so, as between Government tracts, there would be no offset requirement. If the well were drilled on state land, it would.

MR. SCHULTZ: Most of this is Government acreage.

MR. MORRELL: The majority is Government acreage. However, the distribution of the acreage owned by the state and the

patented land is the key to this whole problem, and is what has instigated preliminary meetings and the request for this hearing.

MR. ENGLISH: If somebody owned the royalty and he demanded that you drill it--it is Government land and the acreage belongs to someone else, and he says I want my royalty, how can you keep him from it?

MR. MORRELL: By going before the Commission and getting it thrashed out. I believe that answers it.

MR. McLEAN: Mr. Jenkins, I believe you testified a few minutes ago that you were unable to testify how long it would take to--take for each well in the Blanco field to pay out because you had no figures as to the price that could be obtained for the gas?

A. That is correct.

MR. McLEAN: Are you familiar with the general price that is paid for gas in that same area in other fields?

A. How do you mean in your statement about the same area?

MR. McLEAN: Are you acquainted with the general levels of prices of this gas in other fields in the same general area?

A. Yes.

MR. McLEAN: This gas in the Blanco field is sweet gas, isn't it?

A. Yes.

MR. McLEAN: Now, if there should be a market for this gas at the well head, could you say what would be the probable price of the gas, considering what is being paid in other fields in the same general area?

A. No, I couldn't. I can tell you why. I have absolutely nothing to do with what we agree to accept for our production.

That is a matter for our management to decide. I couldn't answer your question.

MR. McLEAN: If you were to assume that the price would be approximately 7¢ per thousand cu. ft., could you tell then what it would be--what would be the approximate pay out period for those wells?

A. You would have to carry it still further to what would be the take per day, or what would be the various clauses in the contracts and whether there is any escalator phrases, and so forth.

MR. McLEAN: I believe you said you were unfamiliar with the cost figures of drilling wells other than your own?

A. That is correct.

MR. McLEAN: Were you present or did you have a representative present when these other wells in the Blanco field were being drilled?

A. I believe we had a representative present when some of the wells were drilled.

MR. McLEAN: Do you know which ones they were?

A. The No. 1 Shaw. I know that we had a representative there during a portion of the drilling of that well. As far as the rest of them are concerned, I do not know.

MR. McLEAN: I believe that is all. Thank you.

MR. McCORMICK: I would like to ask Mr. McLean something. How much is paid for gas in the Kutz Canyon field?

MR. MCLEAN: I believe Mr. Jim Cole can answer these questions better than I could.

COMMISSIONER SPURRIER: We will recess for five minutes.

(Recess)

COMMISSIONER SPURRIER: Gentlemen in the interests of time, let's let the record show that the going price--the only price, I guess, in the Kutz Canyon field-Fulcher Basin area gas pool--is 5¢ a thousand. If I am not correct--Mr. Cole says I am. Mr. Morgan, you have a question?

MR. MORGAN: Of the Wood River Oil & Refining Co. Mr. Jenkins, your employees, and I suppose they are under your direction, made some tests on Mr. Florance's wells. Is it true that the static shut-in gas pressure on the Jane Mansfield was 1,095, and on the J. A. Pierce was 1,120? Determined by dead weight testing methods. Substantially around 1,100 pounds?

A. No, I cannot confirm ....

MR. MORGAN: You offered an exhibit to the state showing critical flow data on one of the Florance wells.

A. But you quoted some wells that I don't know the names of.

MR. MORGAN: The Mansfield or J. Pierce.

A. One of the Pierce wells?

MR. MORGAN: There is only one Pierce well, so what is the static on the shut-in, the gauge pressure on the Pierce well?

MR. McCORMICK: You may refer to these exhibits, if you like.

A. I imagine that broken down separately ....

MR. MORGAN: Will you agree for the record that it was approximately 1,100 pounds?

A. No, I wouldn't.

MR. MORGAN: Would you recognize this photostat as your own work sheet and your own engineer showing the Pierce shut-in pressure?

A. Something here I recognize.

MR. MORGAN: These are the work sheets that that critical flow was taken from? Mr. Elkins furnished it.

A. Let me see this here. I recognize this. And I recognize this. Now, you have the data sheet ....

MR. MORGAN: Here is the work sheet. Your own engineers, the photostat of it.

A. Now, according to this it shows it is 1,300.

MR. MORGAN: That is at the base of the sand. But what is the gauge from which that is calculated?

A. I don't know.

MR. MORGAN: The record shows 1,095 ....

A. Shut-in tube pressures.

MR. MORGAN: Yes, sir.

A. However, the circumstances under which that collection of data was obtained on that particular page, I don't know what they are. Whether twelve-hour shut-in or twenty-four, or what.

MR. MORGAN: But it is the data in static pressure on which you based your critical flow or study of the Pierce well, is that correct?

A. I believe that data was taken in connection with it, but just what the circumstances were of that particular data sheet with relation to the well, of course, I do not know.

MR. MORGAN: What is the gauge pressure at the present time, shut-in, on the Elliott B. No. 1?

A. 1,212.

MR. MORGAN: In other words, approximately 100 pounds different from the Florance wells?

A. If you say the Florance wells are 1,100 something, that is correct.

MR. MORGAN: For the record, that will be satisfactory. Do you believe this is the area-- Mr. Jenkins, do you believe the area around the Elliott well, and the area around the Florance wells are one and the same field and one and the

same reservoir in the Mesaverde formation?

A. I don't believe that anywhere in my testimony I said one way or the other.

MR. MORGAN: I am asking you.

A. I have left that up to people who have made a much greater study of it than myself. And Mr. Umbach testified that in his opinion it was all one reservoir. And I feel that since he has made more of a study of the section than I have I am willing to take his word for it for the time being.

MR. MORGAN: As an engineer, Mr. Jenkins, how do you account for the discrepancy in the pressures. The difference in the pressures of the one group of wells, if they are all in the same reservoir?

A. I don't recognize that there is a great discrepancy from what I have heard so far. If you are attempting to get some explanation as to why there is 100 pounds difference in shut-in gas pressures, there could be a multitude of reasons to account for that difference. I certainly couldn't say what they are. Because I do not know the conditions in Florance's wells.

MR. MORGAN: May I ask another question. Do you think that it would be possible to drill a non-producing well between the Florance wells and the Elliott well?

A. I would just say I would certainly be surprised.

MR. MORGAN: I believe that is all. Thank you.

COMMISSIONER SPURRIER: Does anyone else desire to cross-examine this witness?

MR. McCORMICK: I would like to ask the witness one question. You have introduced Exhibit 5 here which shows many things, but did tend to show, I think, physical waste might occur from

a conservation standpoint if you had proration units of smaller size than 640 acres. What about economic waste?

A. I am not sure if I know what you mean by economic waste? Do you mean what materials are involved in drilling the well?

MR. McCORMICK: Yes. In your opinion, is it economically feasible to develop this field on the basis of 160-acre spacing from what you know of it?

A. Not from what we know of it now.

MR. McCORMICK: Do you think it is feasible on the basis of 640-acre spacing?

A. We think it has a better chance of being an economic venture then.

MR. McCORMICK: That is all.

COMMISSIONER SPURRIER: I might add that economics are always tied in with waste. They usually are in one way or another. And while this Commission deals primarily with conservation of oil and gas, economics have such a direct bearing on it that it is certainly not improper to discuss economics before this Commission. It has been done many times. Does anyone else have any more questions of this witness?

MR. SCHULTZ: I would like to ask one more question. Mr. Jenkins, does the Stanolind contemplate--I understand from your testimony that you have fourteen units on which you have total or partial control? Is that right?

A. Yes, that is right.

MR. SCHULTZ: Does the Stanolind contemplate going in and drilling fourteen wells?

A. How soon?

MR. SCHULTZ: Well, reasonable development.

A. Do you mind if I answer that question my way?

MR. SCHULTZ: Sure.

A. We are considering a steady development in that field after we can see that we can get some money for what we are putting in. By that I mean that we do not have in mind the drastic extent of a boom, neither do we have in mind drilling, starting in one well and maybe not drill another one for four years. It will be entirely dependent. Our rate of development will be entirely dependent upon the progress on unitization as well as what the economic picture appears to be at the time the program for development is considered. In other words, it is quite likely or possible that we would put in a rig in that field and drill as many locations as we could with that one rig in one year as the circumstances warranted, which might be--in other words it-- just speaking my personal opinion in this, I have not consulted with the people that spend the money--I would think it would be quite likely that next year we would drill in the neighborhood of five wells, or maybe just one, maybe none.

MR. SCHULTZ: Do you contemplate that the well you have drilled now, and wells that you will drill in the future, that you will sell that gas to existing pipe lines in the San Juan Basin now?

A. Well, as I answered some other questioner, that would depend upon the terms at which the gas was offered.

MR. SCHULTZ: Do you favor unitization of the area?

A. I believe--yes, I personally favor it.

MR. SCHULTZ: Does the Stanolind Oil and Gas Company favor it?

A. I believe that we do, otherwise we wouldn't be spending time and money in the efforts to unitize.

MR. SCHULTZ: If a majority of operators in a proposed unit

area elect an operator other than Stanolind, would the Stanolind Oil and Gas Company still favor unitization?

A. I feel reasonably sure that we would, because we are involved in several unitizations where we are not operators. And I could give you some examples.

MR. SCHULTZ: That is all.

MR. BARNES: Mr. Jenkins, this deals indirectly with the further development of the area. How do you think this 640-acre spacing would affect drilling? For example, if a couple of operators had taken considerable acreage in the area with drilling commitments and this 640-acre spacing went through, that would relieve them of the necessity of drilling a lot of those locations. Don't you think so?

A. I would prefer to refer that question to our legal talent. I don't profess to be able to answer that question. I know-- I don't know the answer myself. I was just wondering. Could you answer that Paul? Or Judge Seth?

MR. SETH: I would imagine it would relieve them.

MR. MODRALL: Depending upon the contract, wouldn't it, Mr. Seth?

MR. SETH: That's right.

COMMISSIONER SPURRIER: Does anyone else have anything further of this witness? If not, Mr. Jenkins,you are excused. Does anyone else have any comments to make in this case? Or evidence to present?

MR. McLEAN: I would like to present some evidence, please.

CASWELL SILVER, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McLEAN:

Q. Will you state your name, please, sir.?

A. Caswell Silver.

Q. Where do you live, Mr. Silver?

A. Aztec, New Mexico.

Q. What is your occupation?

A. Geologist.

Q. And with whom are you connected?

A. M. J. Florance.

Q. President of the Florance Drilling Company?

A. Yes.

Q. What is your educational background as a geologist, Mr. Silver?

A. I have a bachelors and masters degree in geology and engineering.

Q. From what university?

A. University of New Mexico.

Q. Would you explain to the Commission briefly the nature and extent of the experience you have had since your educational period?

A. Well, approximately six years working in geology with the United States Geological Survey and the United States Coast and Geodetic Survey. The University of New Mexico and four years in the Navy as a geologist of the Navy.

Q. Are you acquainted with the Blanco field?

A. Yes.

Q. Done any work in that field?

A. Yes.

Q. Has the Florance Drilling Company drilled any wells there?

A. Yes.

Q. How many?

A. Approximately five wells in the field--six wells in the

field, if I may correct that.

Q. How many of them have been productive?

A. Three

Q. Three were dry holes?

A. No, two were dry holes, and the third of the non-productive wells was productive and it was decided to abandon the well temporarily. Shut in.

Q. Not productive in commercial quantities?

A. Yes.

MR. McLEAN: Is the Commission satisfied with Mr. Silver's professional requirements?

COMMISSIONER SPURRIER: Yes.

Q. Mr. Silver, could you tell us what the approximate cost of drilling the wells you mentioned by the Florance Drilling Company in the Blanco field have been?

A. The approximate cost of drilling the Mesaverde wells; that is, drilled right to the Mesaverde section with rotary tools, including all testing costs, pipe and completion costs, was $63,000.00 approximate average of the wells.

Q. What about the other wells?

A. One well was drilled to the Pictured Cliffs with approximate cost of $12,000.00. Another well was drilled to the Farmington sand. I wouldn't be able to tell you the approximate cost on that. Mr. Florance could probably do that.

Q. Is the Florance Drilling Company planning to drill any other well or wells in the near future?

A. As a contractor, it is planning to drill some wells immediately, with the permission of the Commission, under contract for the Delhi Oil Company.

Q. And to what formation is it contemplated that those wells will be drilled?

A. To the top of the Mesaverde.

Q. And could you tell us what the estimated cost of those wells will be?

A. We estimate that the wells will be completedfor $45,000.00.

Q. Could you tell us something about the character of the gas in the Blanco field? Something about its composition?

A. I have before me the composition. Tests were run on four wells owned by M. J. Florance and Wood River jointly. The William Mansfield No. 4 in Section 29 ....

Q. .... now, Mr. Silver, this instrument that you are testifying from is marked Delhi Oil Company Exhibit 1. Is that right?

A. Yes. This instrument shows the composition of four wells drilled in the Blanco field, three of which were drilled by M. J. Florance on his own account and one drilled in 1927 to 1928 by the Huntington Park Oil Co. The composition shown on this sheet--I would like to read from the sheet the calculations which I am about to give. The average composition is based upon a CO_2 free sample as CO_2 is so low the calculated values are as good as would be those corrected for CO_2 content. I might add that the Huntington Park Wm Mansfield No. 1 which has been producing for twenty years is included in this average. Its composition is markedly lower than the other wells. These analyses represent the analysis of the gas taken at the stabilized flowing pressure of 350 pounds, which was deemed to be close to the desirable operating pressure of a gasoline absorption plant. The following procedure was used for sampling these wells: the wells

were all open to the atmosphere, and blown down for a twenty-four-hour period preceding the sample. Each well was then partially shut in by three inch valve until there was a stabilized flowing pressure of 350 pounds. The sample vessels were purged under this 350-pound flowing pressure four times before the final sample was taken. The average composition shows nitrogen .47 of one per cent, methane 85.51 per cent, ethane 8. 76 per cent, propane 3.27 per cent, isobutane .39 of one per cent, N butane .80 of one per cent, pentane S plus .78 of one per cent. I might add that roughly calculated on the basis of the composition just given that there would be approximately one and one-tenth gallons--and this testimony is from memory since I have the data in my brief case, but I think I can give it very close, and it can be check from this exhibit by any engineer--roughly one and one-tenth gallons per thousand cu. ft. of propane, .45 of one gallon per thousand cu. ft. of butane--that is a combination of isobutane and normal butane--and approximately .40 of one per cent--pardon me--.40 of one gallon of pentane plus. The economic value of these products has considerable bearing on the value of the gas in the field.

Q. Well, now, does the presence of these other liquids that you mention in the gas increase the value or decrease the value?

A. They increase the value.

Q. And does this gas in the Blanco field become more valuable or less valuable than gas with a high hydro-sulfide content?

A. More valuable.

Q. And more or less than gas with a high carbon dioxide content?

A. More valuable.

Q. Can you tell us whether or not it would be necessary to put this gas through a treating process in order that the gas would be suitable for sale to the general public for domestic consumption?

A. It would not be necessary to treat this gas in any way.

Q. In other words, as compared to sour gas this gas would be more valuable because you would save the cost of treating it?

A. Yes, sir.

Q. Do you know approximately what percentage of the acreage in the Blanco field the Florance Drilling Company has an interest in?

A. I am speaking from memory. The figures I have in mind were delivered by Mr. Foster Morrell or Jack Frost at a preliminary hearing to this hearing, and I believe that they said that Wood River Oil and Refining Company and M. J. Florance jointly had a forty-three per cent interest. Is that right, Mr. Morrell? Forty-three per cent interest in the area shown or entered as an exhibit by Stanolind.

Q. You and Wood River Oil and Refining Company jointly own that acreage?

A. Yes.

Q. Is all that in 640 acre tracts or is there some smaller units?

A. There are some smaller tracts.

Q. So if the 640-acre spacing were set up, it would be necessary for your company to join with other companies in order to develop the tracts in which you own an interest?

A. Yes.

Q. Do you know whether or not your company would be interested in entering into an operating agreement for the development

of any unit in the Blanco field if the operator represented to you that it was going to cost over one hundred thousand dollars to drill a well?

A. I can answer that definitely. We would not participate in any plan where the cost was one hundred thousand dollars, or even fifty thousand dollars, since we believe that wells can be completed under a figure of fifty thousand dollars.

Q. In other words, you can drill them for considerably less than that?

A. Yes.

Q. And have drilled them for considerably less?

A. I cannot go with you on that final statement. To date we have not drilled one for considerably less than that. But our drilling experience has shown that under the completion practice recommended by the Geological Survey that drilling a well to the top of the Mesaverde would be considerably cheaper than any heretofore drilled.

Q. You have not drilled any that cost less--cost anywhere near one hundred thousand dollars?

A. No, we have not.

Q. Can you tell us something about the nature and character of the topography in the general area of the Blanco field?

A. The description of the topography is always general. I would describe the topography on the Blanco field as varying from flat to moderately hilly to extremely rough. There are many dry washes that become impassable in flash floods, and numerous high cliffs of sandstone exceeding 500 feet in height, so that in many areas it is difficult to go between two points a mile apart without traversing four or five miles.

Q. If it were necessary to drill a well within a few hundred

feet of a designated location, and that point happened to be in a very irregular terrain, do you have any idea as to how much it would cost to drill such a well because of the nature of the topography?

A. That would depend entirely upon the particular location involved.

Q. It would be considerably an extra cost in any event, wouldn't it?

A. Yes, it would.

Q. Now, as to the market for gas. There isn't any gas being produced and sold from this field at the present time?

A. Yes, there is.

Q. Could you tell us what that is?

A. One well, the Huntington Park No. 1, which has been producing gas for twenty years, delivers gas to Aztec, N. M. through approximately a ten-mile pipe line.

Q. And do you have any geological data obtained from the drilling of that well?

A. Records on that well were very poor. We have some old logs which we consider unreliable.

Q. But as to all wells that have been drilled since that well there is no actual gas production at the present time?

A. No, there is not.

Q. Do you know whether or not in the forseeable future there will be a market for gas in that field other than the market to Aztec which you have already mentioned?

A. I have no positive assurance in the form of a written agreement, but I have had verbal assurance that there will be a pipe line constructed to the area within the next few months. A fourteen-inch pipe line.

Q. Based upon your experience as to costs of drilling these wells, do you think that it will be profitable for your company to drill wells and develop this field if there is a line laid to the field so that there would be a market for the gas?

A. I do.

Q. Do you think that wells would pay out if there were such a line laid to the field?

A. At this point I would say, I would agree with Stanolind that the amount of information in the field is rather poor. There is no way of telling at the present time exactly what the pay out would be in this field. However, based upon figures given in testimony by Mr. Jenkins today on that field, taking his thickness of effective pay, his bottomhole pressures, his porosity, his percent connate water, and roughly estimating the amount of recoverable gas in the area, I would say that if the formations were uniformly to average the effective thickness that he indicated in the Elliott well, that the reserves in the Blanco field would exceed 20,000,000 cu. ft. per acre in the Mesaverde formation. That can be checked by merely using the figures given in testimony today. That is based upon a 200-pound abandonment pressure.

Q. Now, Mr. Silver, from your experience in this field, would you say that you have had enough reliable engineering and geological data from which you could determine the extent of this field?

A. No.

COMMISSIONER SPURRIER: Mr. McLean, does the record show the number of acreas you are speaking of when you say a well will pay out?

MR. McLEAN: No, it doesn't.

Q. When you were testifying a moment ago as to whether or not wells would pay out, could you tell us how many acres would be necessary to be included in that well unit in order for the well to pay out?

A. That is a question of economics extending over a long period of time. It varies with the variable interest rates. Also varies with the production history of those wells. It would be impossible at the present time to tell how much acreage would be necessary to make a well pay out.

Q. Do you think there is considerable--enough--data available at the present time so that a fair comparison could be made between the Blanco field and the Kutz Canyon field, thereby using data obtained from the Kutz Canyon field as a guide for what will take place in the Blanco field?

A. No, I do not.

Q. In other words, it would not be a reliable way of trying to determine what will be encountered in the Blanco field?

A. It would not. In my opinion, of course.

Q. Do you think there is enough data available so that it could be determined at the present time whether or not one well in the Blanco field would drain 640 acres?

A. No, there is not enough data at the present time.

Q. And as to the cost of the wells per acre, Mr. Jenkins testified to that a moment ago. I believe he testified that if one well were drilled for every 640 acres, then that would be just one-fourth the cost per acre as if one well were drilled per 160 acres. That would be true only in the event that the one well drained the entire 640-acre-tract?

A. That is true.

Q. In your opinion, Mr. Silver, would a 640-acre spacing rule allow sufficient flexibility of development of the Blanco field so that there would be an optimum recovery of gas from it?

A. No; that is, if I may qualify that no. So little is known concerning the reservoir characteristics in the Blanco field, that it would be impossible to predict at the present time the effective radius of the drainage of any well in the field.

Q. What, in your opinion, would be the most practicable way of obtaining the most economical and practicable exploitation of this gas? Would it be to have no spacing requirements or would it be to have less than 640-acre units or what?

A. As there--this field appears to be a marginal gas field. It could become overdeveloped in a little area so that some of the wells would not pay out in the preliminary stages. However, it is my opinion that more would be learned about the reservoir characteristics from a few wells closer together; that is, more would be learned in a shorter length of time, than from the same number of wells spaced on 640-acres. Too, I will say that one might refer to simple geometry, which says that effective area drained is porportional to the square of the radius that well drains. If you have wells 640 acres apart versus wells 320 acres, which would be a half mile apart, simple geometry would say that it would take four times as much, presuming you had a uniform reservoir through--to decrease interference between the wells. If you had uniform reservoir and uniform communication. That is something we don't know about that reservoir. What the communication will be and whether there will be interference.

COMMISSIONER SPURRIER: Mr. McLean, how much longer do you anticipate it will take you here?

MR. McLEAN: I can finish my part in just a few minutes.

COMMISSIONER SPURRIER: Judge Seth, do you have a rebuttal?

MR. SETH: I just want to ask a few questions.

COMMISSIONER SPURRIER: Does anyone else have any lengthy comments to add? If we can finish in fifteen minutes, that is all right. Otherwise, we will shut down until tomorrow morning at ten o'clock.

MR. McLEAN: It will probably take morethan fifteen minutes.

COMMISSIONER SPURRIER: That is the way I feel. I am inclined to call the meeting to a halt. Do you have any preference as to the time we shall meet in the morning?

(Discussion omitted)

COMMISSIONER SPURRIER: I guess nine o'clock will be fine. This meeting is recessed until that time.

(Hearing resumed at nine o'clock A. M. Oct. 29, 1948.)

COMMISSIONER SPURRIER: Gentlemen, lets get started. Mr. McLean, we will remind Mr. Silver that he was sworn yesterday.

Q. Mr. Silver, in the petition which was filed in this case the Commission was asked to impose a rule requiring the setting of surface pipe through the shallow water beds in the Blanco field, and in any event to a depth of 250 feet, I believe. What, in your opinion, would be a fair, reasonable, and practical requirement for the setting of surface pipe?

A. I believe that the purpose for which surface pipe is used would be best served by setting the surface pipe a sufficient depth into a hard rock formation and circulating cement to the surface to insure that proper control and prevention of blow out could be prevented. In some areas where there was

considerable fill, alluvial fill, they might want as much as four or five hundred feet of surface pipe. Other areas where hard sandstone occurs immediately at the surface, some fifty feet of surface pipe would be entirely adequate. Any requirement such as is proposed in the petition presented by Stanolind to the Oil and Gas Commission would increase the expense of the well markedly. And since we are dealing with an area in which the economics of the situation, the cost of drilling, is a large factor, it is in the interests of conservation and development of the area that costs be kept down.

Q. In the wells that your company has already drilled in the field, how was the surface pipe set, and to what depth was it set?

A. I am giving approximate depths of surface pipe. We set, I believe, 800 feet down the first well. Thereafter, reduced it to some 350 feet, and then further reduced it to some 220 feet. And since that time we have started the practice of drilling some fifty feet into a hard, firm subsurface rock and circulating cement to the surface. And in some cases put in 100 feet, and in some cases 70 feet, and in some cases 130 feet, depending upon the merits of the situation as determined by the drilling.

Q. How deep were the shallow water beds usually?

A. We have found in the area that water is present at variable depths in the tertiary formations. In the wells which we have drilled in the field, the largest flow of water has been encountered in the low part of the Animas formation and in the Ojo Alamo sandstone, where we have encountered sufficient quantities of water to come to the surface if left uncontrolled.

Q. About how deep were those formations just mentioned?

A. In the average over the block we have encountered strong flows of water at seven, eight, and nine hundred feet, and eleven hundred feet. That is approximate.

Q. Could you tell us something about the physical characteristics of this water you have encountered?

A. Well, very little is known about the physical characteristics of the water, except that--I say very little is known in that no accurate chemical analysis has ever been made--however, some of the surface--some of the formation waters do seep to the surface in the area. In Section 29 in Township 30 North, 9 West, immediately back of the house on the M. J. Florance-Wood River Mansfield wells there is a natural seep occuring in the formation which is sulphurous and poisonous to animals, which has been the subject of difficulty to local ranchers. In the Goede No. 1 we encountered a strong flow of water at 760 feet, which by cursory examination and taste appeared to be the same type of water that occurred in surface seepage, sulphurous and unpalatable and probably poisonous to stock, although that is not known.

Q. Well, from your esperience in the field, would you say that the proposed rule as stated in Stanolind's petition in this case would be unnecessary?

A. Yes. I think in some cases it would so markedly increase the cost of drilling the well as to make it difficult for some small operators to obtain the necessary large size surface pipe and go to the additional expense of carrying a well to the depth indicated in the petition. In my opinion, such a depth would be unnecessary in many cases.

Q. You think that setting at least fifty feet in the first

hard rock formation would be sufficient?

A. Yes, I do.

Q. Now, you gave quite a bit of testimony yesterday, Mr. Silver. Considering all your testimony and experience, would you say--are you in a position to state--what sort of spacing requirements would, in your opinion, be practical and fair to all interested parties in the Blanco field?

A. It would appear to me that 320-acre spacing would be a fair preliminary spacing in the Blanco field, subject to the further determination of the reservoir characteristics through production and pressure decline, at which later date the proper spacing in the field could be more adequately determined.

Q. Just so that the Commission might have a brief summary of some of the reasons that you gave yesterday--the testimony was somewhat lengthy--let me ask you if this is substantially a correct summary of some of the reasons which you gave for that opinion. First, that a 320-acre spacing requirement would encourage the development of the Blanco field more than a 640-acre spacing requirement. Is that correct?

A. Yes.

Q. Second, that it would allow more flexibility of development. Is that correct?

A. Yes, in so far as small interest owners would be enabled to get together with greater facility.

Q. You might say then that it would make it easier for some of the smaller owners not owning 640-acre blocks to unitize and communitize their interests and be in a better position to develop their tract. Is that right?

A. Yes.

MR. McLEAN: I believe that is all.

COMMISSIONER SPURRIER: Does anyone care to cross-examine the witness further?

MR. SETH: May I ask a few questions?

COMMISSIONER SPURRIER: Judge Seth.

BY MR. SETH:

Q. Mr. Silver, how many 640-acre tracts does your company own? Use that map.

A. Thank you. On closer examination, I would say that we owned eight full 640-acre tracts.

COMMISSIONER SPURRIER: Who is "we", Mr. Silver? Florance Drilling Company?

A. We stands for M. J. Florance and Wood River in a ratio of 50-50.

Q. There are a lot of fractional tracts?

A. Yes, there is.

Q. How many wells have you drilled in this area?

A. In the area shown in color on this map, we have drilled four wells, one of which is not completed and not shown on that map.

Q. Now, the proposed special regulations--I mean spacing regulations-- would enable your company to drill some six more wells right away, would they not?

A. If they so desired, yes.

Q. And the eight you refer to are cases where you own 100 per cent of the section?

A. Yes. And I did not take into account those which might have already been drilled.

Q. Then you could go ahead and drill on at least six more of

of those full sections if you wanted to?

A. Yes.

Q. Now, you say that this closer spacing would tend to more rapidly develop the area?

A. If I may answer that question in my own way, there is some question as to the definition of rapid development. Do you mean rapid development from the point of view of the number of wells drilled or amount of area to be proven up?

Q. I mean to determine, you might say, the reserves.

A. On the point of view of determing the reserves that would be entirely dependent under either program, whether 320 or 640, on where the wells were drilled and who drilled. So, I don't feel that I can adequately ....

Q. Wouldn't the 640-acre spacing tend to determine the boundaries of the pool earlier than the 320-acre spacing?

A. For a given number of well, yes.

Q. Well, isn't the determination of the boundaries of the pool quite an important matter?

A. If I may answer that question in my own way ....?

Q. That is all I want.

A. The determination of the boundaries of the pool and the amount of reserves in the pool would be extremely important were there no contemplative market available and it were necessary to bring a pipe line into the area and to show a large reserve so as to induce a market. However, I believe we will hear some testimony this morning which I am not familiar with myself which will tend to show that there will be an immediate market in a very short time, and, therefore, the determination of the boundaries of the field is not so important to the individual operators involved.

Q. Wouldn't these widely scattered wells more accurately determine the whole geological situation underground?

A. It is always true that the more wells you drill the more information you have.

Q. And the wider they are apart the better information you would get?

A. That is not necessarily true, that the wider apart they are.

Q. Aren't these wells that you have there now close enough for you to determine interference?

A. I don't believe it is possible to answer that question. At the present time we don't know how close wells would have to be to determine interference.

Q. Have you tried to determine interference?

A. No, we have not since no production has been taken from the field. Without the waste of considerable quantities of gas, in the interests of conservation we have never attempted to determine interference.

Q. Your wells are spaced now as closely as they would be on a 320-acre spacing pattern, are they not?

A. In part they are.

Q. And if not more--and even more closely spaced in some instances?

A. I believe in one instance possibly.

Q. And it is your idea that you would drill unnecessary wells in order to determine interference?

A. No, not necessarily. We hope through production in the field and pressure decline to be able to determine the characteristics of the field and the amount of communication in the field over a period of extended production.

Q. Well, isn't it important that the wells be so spaced as to

prevent interference, if possible?

A. That would depend entirely upon the characteristics of the reservoir.

Q. Well, assuming that they should be spaced far enough apart, wouldn't it be better to make wide spacing, and then later on bring them closer together in a drilling pattern?

A. We think that the question of wide then comes into being. It is my opinion that 320-acre is sufficiently wide.

Q. Wouldn't it be better--there will be only a certain number of wells drilled in the field in all probability in the course of several years. Isn't that the situation in all probability?

A. Yes.

Q. Wouldn't you get more information about the reservoir, its characteristics, and the average over the reservoir of the producing pay, by wide spacing than by close spacing?

A. Well, I find it difficult to answer your question using such an indefinite term as wide and narrow. Could you be more specific?

Q. Wouldn't 640-acre spacing be--more readily--determine the character of the whole reservoir and its reserves than the 320-acre spacing?

A. On the contrary, it is highly possible that with 640-acre spacing it may take a much longer period of time to determine the reservoir characteristics.

Q. Why?

A. Because the distance between wells is greater and wells drain an area laterally from the well bore. The size of that area varies directly as the square of the radius of the area drained. A well a mile apart from the other wells would

take four times as long to drain an area and show communication as a well a half mile apart.

Q. Now, we all know that ....

A. .... presuming, I might add, that you have a uniform reservoir with uniform porosity and optimum reservoir conditions.

Q. Assuming that only a limited number of wells will be drilled, which, of course, is the case, wouldn't you get more information by having them spred out on 640-acre spacing than on 320-acre spacing?

A. That is a matter of opinion. I am inclined to the opinion that possibly 320-acre spacing would give you more information. Not as to reserves but as to reservoir conditions.

Q. You testified yesterday, I believe, about this being a marginal pool. Is that your idea?

A. Yes.

Q. What do you mean by that?

A. I mean it is a field in which the future development is closely tied to the economics. That is, the cost of drilling and the cost of development as to the market price of gas.

Q. There isn't a great deal of margin to be hoped for? I mean cost of production and cost of drilling?

A. On the contrary, our company is of the opinion that these wells will have a very good pay out because of the rich, moderately sweet nature of the gas, and the deliverability of the wells.

Q. By marginal pool you meant one concerning which there is some doubt. Is that what you mean by marginal pool?

A. No, I meant one in which costs have to be very carefully controlled.

Q. And for that very reason isn't the number of wells a very important factor?

A. Yes, it is.

Q. You might drill wells so close that none would pay out?

A. That is always possible in any field.

Q. And particularly in a gas field?

A. Well, it follows.

Q. What is the market price of gas up there now?

A. To my knowledge, the only purchaser of gas is Southern Union Production Company, which is paying a fair price of 5¢ a thousand.

Q. Is there any other purchaser immediately available?

A. Yes, we have been assured of another purchaser. I think you will hear about it in testimony this morning.

Q. That will be several years off?

A. No. I am not familiar enough with the details, I would rather leave that to the testimony of the later witness.

Q. In giving your cost of the well, I believe you said forty-five to fifty thousand dollars to the top of the Mesaverde?

A. Well, I meant a completed cost of forty-five or fifty thousand dollars.

Q. You said to the top of the Mesaverde several times. What do you mean by that?

A. I meant that I would drill with rotary tools to the top of the Mesaverde, set pipe on the top of the Mesaverde, and set standard tools and drill through the pays.

Q. Did you add the cost of the cable tools?

A. Yes.

Q. How much coring did you do on those wells?

A. In the case of the wells already completed?

Q. Yes.

A. I am not sure of the exact amount of coring that was done in those wells. But no records were kept of the cores at the time. I wasn't employed by the company.

Q. Did you core with cable tools?

A. Yes, we do.

Q. In other words, there is no information prepared on the coring available?

A. That is correct.

Q. And your figures that you gave here yesterday are all based on the assumption that the Stanolind's coring is correct?

A. Did what?

Q. Based on the data that Stanolind obtained from its coring?

A. Not all information. What information specifically did you refer to?

Q. I mean the thickness of the pay, and so forth.

Q. Well, I have my own opinion as to the net pay and thickness of the pay, which I, by virtue of examination of our electic logs ....

Q. .... but you testified yesterday several times, assuming that you were basing your statements on Stanolind's data.

Q. Only basing the amount of recoverable gas per acre on Stanolind's data. It, incidentally, coincides very closely with the data we had postulated from the electric logs.

Q. This forty-five to fifty thousand dollar cost which you gave doesn't include that coring?

A. Not more than one core.

Q. And how much coring would that be proportionally? How thick is the pay from the top of the Mesaverde to the bottom

of the pay?

A. The total Mesaverda section is of some 650 to 800 feet, and the net pay in that whole section might be a total of 150 feet.

Q. What do you mean by one core?

A. Well, the amount of core that would be cut by one trip with the standard core barrel type J core barrel with one cutter head. Usually about eighteen to twenty feet.

Q. What was the cost per foot on those wells?

A. I don't have the figures.

Q. Florance is engaged in the drilling business for other people, is it not?

A. Yes.

Q. Has a contract with Delhi Oil right now?

A. Yes.

Q. What is the cost per foot?

A. Eight and a half dollars per foot.

Q. That doesn't include any furnishing of materials?

A. We furnish everything but the pipe and cement.

Q. And, of course, Delhi furnishes all the other materials for the completion of the well?

A. Yes.

Q. Then what material do you furnish? Just the drilling?

A. We set the pipe.

Q. You do the work andthey furnish the materials, is that right?

A. They just furnish the pipe and cement. As to water, mud, and other materials, we furnish them all.

Q. Is there any other consideration in the contract?

A. No other consideration whatever. I believe that figures

to $34,500.00 to the top of the Mesaverde based on a 4,200 foot well.

Q. After getting to the top of the Mesaverde, what is the cost?

A. Generally, $250.00 to $275.00 a day for standard tools.

Q. And they still furnish all the materials?

A. No. That is, in the event of standard tools there is no material that need be furnished.

Q. They furnish the pipe?

A. There is no further need of pipe.

Q. Tubing?

A. Well, tubing, yes.

Q. They furnish the tubing?

A. Yes.

Q. How many feet do you make a day?

A. Using our experience in the area, from individual contractors that we have compared, indicates that standard tools can drill in that area 100 feet a day.

Q. Do you have any trouble with losing circulation in that drilling of those wells?

A. We have never had any trouble with losing circulation down to the point contracted with Delhi Oil Company.

Q. That is the top of the Mesaverde. But I--but when you get down to the pay, do you keep circulation down there?

A. We have lost circulation down in the pay, yes. But in the approved drilling and completion practice, which we now contemplate, that possibility of losing circulation is avoided.

Q. Isn't it good drilling practice or good practice for any oil operator to do considerable coring to find out what is underground?

A. If the needs of the situation require it, yes.

Q. And in a new field, don't the needs of the situation require it?

A. Sometimes they do and sometimes they don't. In outpost wells it is desirable, but perhaps in inside wells there is considerable saving involved, and most operators attempt to save as much money as they can on a job.

Q. Don't they need geological data?

A. Yes.

Q. How do they get it?

A. Well, they can get it by performance characteristics of the wells after completion.

Q. But where you are trying to spred out and find out the characteristics of a new pool, isn't it almost essential that coring be done?

A. Well, not necessarily. Some methods today of reconstructing cores--electric logs, extrapolation of electric logs--succeed in giving much of the information at cheaper cost than coring.

Q. Were you in charge of drilling the Florance wells already drilled?

A. No. I was geologist on Shaw No. 1 and Shaw No. 2, which are non-productive wells. I wasn't present when the other wells were drilled.

Q. Did you take any cores in the ones you drilled?

A. Yes, sir.

Q. They were dry holes?

A. Yes. May I add at this point some testimony? If we had not cored and had set pipe at the top of the Mesaverde, as presently prepared, and then using standard tools, in all

probability we would have had much more accurate information about what the well would produce in quantities of gas than by coring. Because when you core with rotary tools in fine grain sandstone you harm and hurt the pay to such an extent that it is difficult thereafter to determine what that pay would do if given a chance without mud and water. So that in this particular field it may be advantageous, and in fact desirable, not to core through the Mesaverde.

Q. You recommend that?

A. Yes, I recommend keeping mud and water off the pay.

Q. You think the field can be developed and its characteristics learned without any more coring?

A. Yes, I do.

Q. How much more would it cost to set 250 feet of surface pipe then to set fifty?

A. At the present time I am not familiar with the market price of steel, but I do know what we are paying for pipe of the size necessary for surface pipe in the area. We are paying from five to six dollars a foot for ten-inch pipe which we use for surface pipe.

Q. That would add from a thousand to twelve hundred dollars to the cost of the well. That setting is not much of a problem?

A. That would add that much to the cost of the well where the minimum of pipe is used. But in the case of setting pipe to the shallow water beds that would entail the setting of 1,100 feet of pipe.

Q. Would you call that shallow water beds?

A. Yes, that is considered shallow.

Q. In arriving at the cost of these wells, would the Florance

Drilling Company use its own equipment?

A. In part.

Q. Would it take into consideration the cost of depreciation on its equipment?

A. Yes.

Q. How many wells has Florance drilled outside the Blanco pool?

A. Oh, in the San Juan Basin about seven.

Q. About seven. In Kutz Canyon?

A. He has drilled some in Kutz Canyon.

Q. They are all drilled without coring?

A. Yes, with the exception of one in the El Hurfano area.

MR. SETH: That is all.

MR. McCORMICK: I would like to ask Mr. Silver some questions.

BY MR. McCORMICK:

Q. I presume you are expressing the views of the Florance Drilling Company in your testimony?

A. Yes.

Q. That is not a corporation is it?

A. No, I am really expressing the views of M. J. Florance.

Q. And Mr. Florance is an equal partner with the Wood River Oil & Refining Company?

A. Yes.

Q. Are you also expressing the views of the Wood River Oil & Refining Company?

A. In this case, yes.

Q. Does the Florance Drilling Company have any drilling contracts with the Delhi Oil Company now?

A. Yes.

Do you know whether or not Delhi Oil Company is affiliated

with the Southern Union Gas Company?

A. I don't know their affiliation.

Q. Would the attitude of the Florance Drilling Company be influenced by its business relations with the Delhi Oil Company?

A. Absolutely not. The interests of the Florance Drilling Company, as any independent operator in the area, is the rapid development of the field and the marketing of the gas, and the immediate possibility of income. We are influenced by the possibility of getting an immediate market for our gas and getting a return on our investment in the area which exceeds a quarter million dollars.

BY MR. BARNES:

Q. Mr. Silver, this is a question I don't think you can give an exact figure to, but I think it is important for the record. Under present conditions with the present spacing regulations, and so forth, could you approximate how many wells the Florance Drilling Company would plan to drill for future development under present spacing regulations?

A. Of course, that is a decision of management. I do not know. Mr. Florance has brought up the subject of drilling two more wells almost immediately when we get our equipment available.

Q. What I mean is in the course of developing the acreage you hold in the area. Approximately how many wells do you think you will drill to develop your acreage?

A. That will, of course, depend upon the available market. At the present time, I understand there will be an immediate market for ten million cu. ft. Of course, that also involves the deliverability of wells as allowed by the United States

Geological Survey. That will all have to be worked out between the open flow potential of the wells and the Geological Survey and operators involved.

Q. Well, if you had 320-acre spacing, would you drill the same number of wells that you now contemplate? Let's put it that way, without any actual figures. Do you think you would drill the same number of 320-acre spacing wells as you would drill under present spacing regulations?

A. There is a possibility that we would drill more since our drilling would be facilitated by 320 instead of 640.

Q. Under 640 do you--would you--still drill the same number of wells?

A. We might not be able to drill the same number of wells under 640.

Q. In other words, you feel under 320-acre spacing you would probably drill more wells and drill them sooner?

A. Yes.

MR. BARNES: That is all.

BY MR. McCORMICK:

Q. Does your concern have any contract with a purchaser up there to sell your gas?

A. I don't have knowledge of it if there is such a contract.

Q. Is there one being negotiated?

A. I think there is.

Q. That is with Southern Union?

A. Southern Union and Delhi both.

Q. Are negotiating to purchase from Florance?

A. Each separately are negotiating at the present time.

Q. Have either Delhi or Southern Union indicated to your company that it would purchase gas more readily on one drilling

pattern than another?

A. No.

Q. From the standpoint of one company purchasing gas, what difference would it make to them about the drilling pattern?

A. Only this, that if we had a finite area, a definitely bounded area, which had gas that you could get more gas at any one time out of that area with a smaller pattern than you could with a larger pattern, and if the company were interested in getting larger amounts of gas, it would be more interested in the smaller pattern. That is, if all wells drilled in with approximately the same deliverability you would get more gas out of ten than five.

Q. Assuming that within the next twelve months ten wells would be drilled in this field. Which drilling pattern would tend to prove the reserves more, the 640 or 320 or 160?

A. Well, that would depend, of course, on who drilled them and where.

Q. Well?

A. But possibly greater reserves would be proven by the 640-acre spacing.

MR. McCORMICK: That is all I have.

BY COMMISSIONER SPURRIER:

Q. How many wells would you contemplate, Mr. Silver, for your market of ten million cu. ft. per day?

A. Well, as I said, that would depend upon the allowable. That is, deliverability allowed by the United Stated Geological Survey, which regulates the production of oil and gas from Federally owned acreage. In general, they like to see a well produced in such a manner that it would get the greatest ultimate return with the greatest conservation. And in best

keeping with reservoir characteristics. That is not an open and shut rule, but as a matter of form, if I may speak for Mr. Morrell, I think it is twenty-five you like to keep it under.

MR. MORRELL: That's right.

Q. In other words, you don't know that at this time?

A. We know, based upon the deliverability of present wells, how much gas they will produce.

Q. And the wells that are now drilled are the only things you have to anticipate upon?

A. There is an immediate drilling program of the Delhi Oil Company for three more producers. I can't speak for our management, but they contemplate some drilling.

COMMISSIONER SPURRIER: Does anyone care to examine the witness further?

BY MR. MORRELL:

Q. Merely for clarification, and to repeat your testimony, I think you stated that you found artesian water between seven and eleven hundred feet in depth. Did you find any water above in the Pictured Cliffs formations in the Mesaverde area in the Blanco area?

A. We have always kept the well bore full of mud in drilling and kept our hole in such shape that we have never determined any water. We have kept free circulation of water out of the well bore. But from coring some of the sands up above, we have found mildly salt water in some of the Farmington sands and in the upper Farmington sands particularly.

MR. MORRELL: That is all.

BY MR. McLEAN:

Q. You said a moment ago, Mr. Silver, I believe, that 640-acre spacing might prove reserves better than 320 or 160-acre

spacing. That would be true only in the event that you assume that the same number of wells were drilled on the different patterns?

A. Yes. And I might correct that statement. If I said better, I was in error. It might prove more, but not better.

Q. And if a 640-acre spacing pattern would tend to discourage drilling operations, then your testimony would not be true because there wouldn't be the same number of wells drilled in each case?

A. Exactly right. In my opinion, 640-acre spacing would discourage drilling and make it difficult for more blocks to be gotten together for drilling purposes.

MR. McLEAN: Thank you.

COMMISSIONER SPURRIER: Does anyone care to examine the witness further? Then the witness is excused. Does anyone have anything further in this case?

MR. McLEAN: I would like to call Mr. Schultz.

FRANK SCHULTZ, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McLEAN:

Q. Would you state your name, please?

A. Frank Schultz.

Q. Where do you live, Mr. Schultz?

A. Dallas, Texas.

Q. What is your profession?

A. Geologist.

Q. And with what company are you connected?

A. Delhi Oil Corporation.

Q. And you are also the vice-president of that corporation?

A. That's right.

Q. You are a professional geologist?

A. That's right.

COMMISSIONER SPURRIER: Let's waive the qualifications.

MR. McLEAN: You are satisfied?

COMMISSIONER SPURRIER: Certainly.

Q. Have you had any work in or made any study of the Blanco gas field?

A. I have.

Q. Have you studied some of the geological and engineering data compiled from that field?

A. I have.

Q. Based upon your study of that data and your experience and educational background, is it your opinion that 640-acre spacing patterns in that field would be practical and fair to all interested parties?

A. No, I don't think it would be fair. We feel 320-acre spacing ....

Q. Why do you think 320-acre spacing would be fairer?

A. Well, we don't look upon the field as a marginal proposition. We feel like there is considerable gas and condensate to be recovered, and with a 320--and we think 320 is a maximum spacing program. Actually, with drilling and producing the wells, it is entirely possible that a lesser spacing pattern, a smaller spacing pattern, would be proper. But we feel like in any event that 320 ought to be a maximum. We appreciate that it is important to prove up reserves, prove up the producing size of the field. However, there is nothing to prevent any company that wants to step out and prove reserves from doing it. In our own experience in the

Barker Dome field when we wanted to prove up dome reserves, we have stepped out a mile or two miles and dug a well. If the Stanolind Oil and Gas Company, or other operators in the field, are primarily interested in proving a sizable area, then I believe that it is entirely possible they could step out a mile or two or three and take their chance and drill a well.

Q. In your opinion, would 640-acre spacing pattern tend to encourage or dis courage rapid development of the field?

A. Well, I certainly don't think it would encourage development because it puts control into the large acreage holders, and the small acreage holders, of which Delhi is one, could very easily be prevented from proving up their own reserves.

Q. How much acreage does Delhi hold in this field?

A. 1,140 acres. That is approximately four per cent of the proposed unit.

Q. The proposed entire unitized field?

A. Yes.

Q. Does Delhi own any tract as large as 640 acres?

A. They do not.

Q. What is the largest tract that Delhi does own?

A. We own a 480-acre tract. That is the largest.

Q. Then, of course, if 640-acre spacing were adopted, Delhi could not drill any well unless it unitized the 640-acre tract?

A. That's right. I don't know the legal aspects, but I think it is quite possible that the small leaseholders could be prevented from developing their properties.

Q. Does Delhi have any present plan for going ahead with drilling operations by itself in the event that 640-acre

is not granted?

A. We do. Delhi is a small company. We are primarily interested in getting something done. We want to drill the wells and sell the gas. We are not interested in saving reserves for fifteen years from now. If the 320-acre spacing pattern is granted by the Commission, Delhi will drill three wells and proceed to sell the gas. Thereby, protecting our overriding royalty holders, and I think that is important.

Q. In other words, Delhi is interested not only in producing gas in this field, but also in marketing it?

A. That's right.

Q. And is it interested in marketing not only gas produced by Delhi, itself, but gas produced from others who might produce in the field? Which it might purchase?

A. That's right. Our long range plans call for us to participate in a pipe line to California. That line is scheduled to be completed, if the various Commissions grant the certificate, January 1, 1951. Any gas that is produced in the Blanco field would be welcomed by the San Juan Pipe Line Company.

Q. How much gas are you committed to deliver if everything goes through?

A. Committed to deliver a minimum of 100,000,000 and a maximum of 125,000,000. a day.

Q. Cubit feet?

A. That's right.

Q. I believe that is all.

BY MR. SETH:

Q. Who owns Delhi Oil Company?

A. It owned by 2,500 stockholders.

Q. Southern Union own any stock?

A. Southern Union has no stock in Delhi.

Q. Does the El Paso Natural Gas have any stock?

A. No.

Q. Who owns the San Juan Pipe Line Company?

A. It is owned fifty per cent by the El Paso Natural and fifty per cent by Delhi. El Paso Natural Gas has the operation and control.

Q. Does Southern Union own any portion of the San Juan?

A. No.

Q. These 2,500 stockholders, who is the largest stockholder?

A. C. W. Murchison, Wofford Cain, and Lee C. Moore are principal stockholders.

Q. And they are officers of the Southern Union are they not?

A. Mr. Cain is an officer of the Southern Union.

Q. Mr. Moore is a large stockholder?

A. He owns stock.

Q. A large stockholder?

A. He doesn't have control.

Q. How about Murchison?

A. He owns stock in the Southern Union.

Q. If you had to join with someone else to get a section of your holdings, who would it be?

A. I would have to refer to the map.

Q. It would be Florance Drilling Company and Wood River.

A. Florance and Wood River, that's right.

Q. Did you get your acreage from them?

A. No, we did not.

Q. Who did you get it from?

A. Mr. H. K. Riddle in Albuquerque.

MR. SETH: That is all.

COMMISSIONER SPURRIER: Mr. Schultz, this is nothing but to straighten the record. It seems to me that you have gotten one tract that you would unitize with Byrd-Frost.

A. We have? I am sorry, I didn't realize. Yes, that's right.

BY MR. McCORMICK:

Q. Mr. Schultz, are any of the officers of Delhi also officers of Southern Union?

A. None. Oh, let's see. Mr. Wofford Cain is Chairman of the Board of both companies.

Q. Delhi was formed originally by the officers of Southern Union, wasn't it? As an operating company?

A. I am not--Delhi originally had the same officers as Southern Union.

Q. At the time it was formed it had the same officers?

A. That's right.

Q. Wasn't there some stock purchase arrangement whereby the officers and stockholders of Southern Union were given an option to purchase Delhi stock?

A. That's right.

Q. I notice here on the west edge of Range 9 West all the sections appear to be fractional, less than 640 acres. Some of them appear to be as small as about 400 acres. If you had 320 acre spacing, what would you suggest to take care of that situation?

A. Well, regardless of how we would go, it will have to be a matter for unitizing tracts. There are smaller interests

than 320 all over the proposed unit area.

Q. Well, would you treat those fractional sections as the equivalent of 2-320-acre tracts?

A. I am not entirely sure of the question. Are you asking if we would be willing to unitize this with that (indicating on the map)?

Q. No. For instance, on these fractional sections, would you consider the north half as a drilling unit and the south half as a drilling unit? They appear to be from four to five hundred acres.

A. I don't feel like I am qualified to answer. I don't know the legal aspects of smaller than--it creates a problem I will agree with you there.

Q. If 320-acre spacing were ordered, what would you suggest for the drilling pattern?

A. Oh, generally NE¼ and SW¼.

Q. The center of those subdivisions?

A. It wouldn't make any difference to us actually. Whatever the Commission rules would be fine.

Q. Have you made any preliminary contracts or negotiations with any of your offsetting owners as to unitization?

A. No, we have not. We made a location on that 480-acre tract. That is to be our first well. That location was approved by the United States Geological Survey.

Q. Do you have any commitments from any purchaser up there to purchase any gas which you might produce?

A. Orally, yes.

Q. Which purchaser?

A. Southern Union.

Q. At what price?

A. We have not discussed price. We have an oral commitment from them that they are ready, willing, and able to lay a line in and will as soon as we drill our wells.

Q. Have you given any thought to the situation which would exist if uniform spacing were required, but yet the Commission had no jurisdiction to enforce proration or rate of taking?

A. Well, I understand that the United States Geological Survey, since most of it is Government acreage, in talking to Mr. Morrell that he would force a rateable take.

MR. MORRELL: So far as the Government is concerned, that is correct.

A. That constitutes about ninety per cent of it?

Q. All of your holdings are on Government land?

A. That's right.

Q. You have no state land?

A. Not in the proposed unit that I know of. I think our holdings are 1,120 acres of Federal land.

BY MR. GRAHAM:

Q. Mr. Schultz, as a geologist and without reference to these various rights, in your opinion, what is the best pattern to develop that entire pool, assuming that Delhi owned it all? What is the best pattern?

A. If we owned the whole thing, I still believe that 320 spacing should be maximum for the reason that there is considerable lenticularity in the sands and it is not particularly a high pressure area, and to get the maximum amount of hydrocarbons out of the Mesaverde, it just seems logical to me that it would have to be a fairly close spacing pattern.

Q. Should it be developed as a unit or should you come right on down?

A. If we owned the whole thing, we would step out and drill some wildcats. Two or three miles. As we have done in Barker Dome.

BY MR. SETH:

Q. Did you state the probable market at 10,000,000 cu. ft.?

A. I don't know exactly where the 10,000,000 figure came from. We wouldn't be the immediate purchaser.

Q. Didn't you state 10,000,000?

MR. McCORMICK: I think it was Mr. Silver that mentioned 10,000,000.

A. We a re not in a position to quote on any probable demand for the immediate future.

Q. If you had 10,000,000 outlet and fifty wells, that would be only 200,000 from a well a day, wouldn't it?

A. That is pretty good arithmetic. However, I am not entirely sure where the 10,000,000 a day came from.

COMMISSIONER SPURRIER: Mr. English, do you have a question?

MR. ENGLISH: I would like to make a statement.

BY MR. McCORMICK:

Q. Would you have any particular problems on overriding royalty under 320 spacing?

A. To the best of my knowledge, I don't know of any.

Q. For instance, your company owns all of Section 21, Township 30 North, Range 9 West, except the SW¼. Now, I assume that this is under one basic Federal lease, what you have in 21. Wood River owns the SW¼. Suppose that you made a unitization agreement with Wood River so that a well was drilled in the SW¼. Would overriding royalty from that well be paid only to the owners of overriding royalty under that one quarter section, or would it be paid to owners of overriding

royalty under the south half?

A. I don't know if I am qualified to answer that or not. That is a pretty involved question. I don't feel like I am qualified to answer it. It looks to me like it is a simple matter of mathematics to figure out the overriding royalty.

MR. MORRELL: Mr. McCormick, possibly I could give you some direct information on your question to Mr. Schultz. According to my records on property held by Delhi, they would have on the same basic lease a 320-acre unit for the E½ of Section 21, to which you refer. Mr. Schultz testified that he was interested in drilling three wells on their property. His lease holdings for the remainder of his acreage would require communitization for 320-acre drilling site for the other two wells because there are two different basic leases involved.

Q. That also requires the voluntary approval by the owners of overriding royalties, doesn't it, in order to effect their interest?

MR. SETH: No.

MR. MORRELL: That is a matter for the order of the Commission. It is essentially the requirement of the state law.

Q. If that is--if gas is purchased from a well located in one quarter section, and one person owns all of the overriding royalty under that one quarter section, he can't be forced to divide that overriding royalty with the owner under some other quarter section unless he accedes to it.

MR. MORRELL: Again by state law. It has been upheld by the Supreme Court of the State and the Supreme Court of the United States under the police power of the state.

Q. He can be compelled to unitize, in your view, his overriding royalty?

MR. MORRELL: That is correct.

MR. McCORMICK: That is all.

COMMISSIONER SPURRIER: Would there be one or two wells contemplated in Section 21? On 320-acre spacing?

A. Well, we haven't gotten down to this point of making a second location, and didn't intend to do it until the first well was completed.

MR. McCORMICK: Have you made a location for your first well?

A. Yes.

MR. McCORMICK: Where?

A. It is 1,620 from the north line and 1,230 from the east. Those are approximate.

MR. McCORMICK: Those are--it is in the NE¼.

A. In the NE¼, yes, sir, of that section.

MR. McCORMICK: That is all.

COMMISSIONER SPURRIER: Does anyone else have any further question of this witness?

BY MR. MORRELL:

Q. I would like to ask Mr. Schultz for a little further clarification on this matter of marketing. Is there any definite assurance or time set as to when a pipe line could be laid to the Blanco area?

A. Mr. Morrell, I believe that the Southern Union people are best qualified to answer that. And I understand Mr. Cole will offer some testimony on that.

Q. One further question pending that answer by Mr. Cole. Southern Union would be the pipe line operator and purchaser?

A. Yes, sir.

Q. Delhi would be a purchaser?

A. No, sir, we wouldn't be a purchaser.

BY MR. BARNES:

Q. Mr. Schultz, there has been some rumors that this San Juan Basin-California pipe line where it passes close to Farmington that they might build a branch line to Blanco. Suppose it were true, would this Southern Union line be competitive?

A. The Delhi Oil Company has no say so in the management of the San Juan Pipe Line Company. And I am not prepared to say on the supposition that they will build a line into Blanco. I doubt even that they would try to.

Q. Do you believe it would be possible to have two competing lines into the basin, that is, into Blanco, if this other company contemplated a branch line?

A. It comes to this. That when the San Juan Pipe Line Company is in operation there will be two pipe line companies trying to buy gas. I assume that they will be in competition with each other.

Q. You mean Southern Union and El Paso Natural Gas?

A. Yes.

BY MR. McLEAN:

Q. You don't know of any affiliation or joint stock ownership or joint control that exists, or has existed, between Southern Union and El Paso Natrual Gas, do you?

A. No, there is none. I talked to Mr. Paul Kaiser, president of El Paso Natural Gas,a few days ago in Washington, and he reiterated before the Federal Power Commission that El Paso Natural Gas doesn't own one share of Southern Union stock and Southern Union doesn't own any El Paso Natural Gas stock.

Q. So that in the event that both of those two companies should have a line to the Blanco field, so far as you know they would be in competition with each other?

A. I would certainly think that.

BY MR. McCORMICK:

Q. Did you state the stock ownership of the San Juan Pipe Line Company?

A. I beg your pardon?

Q. Did you state who owned ....

A. Yes.

Q. Who does own it?

A. The El Paso Natural Gas owns fifty per cent with the management, and Delhi owns fifty per cent.

COMMISSIONER SPURRIER: Does anyone have any further questions?

MR. McLEAN: May I clarify a point? Is it your testimony now that El Paso Natural Gas has the right to control the San Juan Pipe Line Company? Delhi owns some stock?

A. El Paso Natural Gas owns fifty per cent of the stock and three of the five directors and has the active management.

MR. McCORMICK: And Delhi owns fifty per cent?

A. Yes.

COMMISSIONER SPURRIER: The witness may be excused.

MR. ENGLISH: I have been over here two times trying to find out why they wanted 640-acre spacing, and I think I know now. The first thing is that Stanolind has gotten so big that they can't operate as cheaply as us little fellows. They have just gotten too big. I drilled a well for less than fifty thousand dollard, and Florance has drilled three or four wells for less than that amount. So, they can't operate as cheaply as we can, so they have to have more gas out of their wells. The second is that they are trying to prove up some subsurface geology, and trying to force everybody else to join in so that they can prove up that subsurface reservoir.

Mr. Se th has been driving all morning to the effect that don't you think that as you moved over you could prove up this structure. It looks like we are trying to prove a subsurface geological structure instead of trying to get something economical to work on. That is my statement.

COMMISSIONER SPURRIER: Now, Mr. McLean, you had something further?

MR. McLEAN: I would like to call Mr. Cole, please.

J. R. COLE, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. McLEAN:

Q. Your name is J. R. Cole?

A. Yes, sir.

Q. And you are vice-president of the Southern Union Gas Company?

A. That's right.

Q. You reside here in Santa Fe, New Mexico?

A. Santa Fe, New Mexico.

Q. Mr. Cole, do you know whether or not Southern Union is planning to build any kind of a gas transmission line to the Blanco field?

A. Yes, sir. We are ready, able and willing to build a pipe line immediately as quickly as we can get the pipe to do it.

Q. Do you have any idea as to the quantities of gas you might be willing to purchase from that field?

A. No, I don't know. Of course, that is variable by shutting down our own production.

Q. What would you do with that gas?

A. We sell it to our customers here in Santa Fe and Albuquerque and Belen.

Q. Your company is a public utility engaged in the purchase and transporting and distributing of gas to the general public for domestic, commercial, and industrial purposes?

A. That's right.

Q. And that is what the gas would be used for if you bought it from the Blanco field?

A. That's right.

Q. And you think you would be in a position to buy some gas if offered for sale?

A. Yes, sir.

MR. McLEAN: I believe that is all.

COMMISSIONER SPURRIER: Does anyone care to cross-examine the witness?

BY MR. SETH:

Q. How much would you take?

A. That is variable. I have heard this 10,000,000 just now. I don't know anything about that. We can go up or down of that figure by controlling our own production.

Q. So long as gas is produced you don't care about the well spacing?

A. No. But if we had a pipe line up there, we want the gas to justify the pipe line.

MR. GRAHAM: Not only immediately, but in the future?

A. Yes, sir.

COMMISSIONER SPURRIER: Mr. Cole, if you are ready, able, and willing to lay the pipe line into the field, you feel that the reserve is there and the pipe line would pay?

A. Yes, sir.

MR. BARNES: Mr. Cole, you are interested in not only a spacing pattern, but the gas. You would like to see the field

built up?

A. That's right. We want the gas now. We need it.

MR. GRAHAM: If the gas failed sometime in the future you would want to know it far enough ahead to arrange for other sources?

A. That's right.

MR. SCHULTZ: Has it been the policy of Southern Union to cut back their own production to take from the other operators?

A. We have always protected the other operator. Always taken all the gas they wanted to sell to us.

MR. SCHULTZ: In other words, your position would be to take all the gas you could from the Blanco area?

A. Yes. That is the general practice of other pipe line companies. I believe the El Paso Natural Gas made a statement to this Commission one time that they were taking less than eight per cent of their own.

MR. McLEAN: Isn't it true that if you did take it from other operators you would be saving your own reserves?

A. Yes.

MR. SETH: Have you fixed the price?

A. We would pay the field price, Judge. At the present time it is 5¢. I don't know what it will be five or ten years from now. We will pay the field price.

MR. SETH: Your company sets the price?

A. Well, yes. We raised it the last time ourselves. However, with two pipeline companies up there in the future, that may not be so easy.

MR. GRAHAM: Mr. Cole, in fields where you have your own wells, do you not prefer the wider spacing?

A. That's right. You don't like your wells to be drained by

others. However, we want to get all the gas we should out of them. So, I think every field has to stand on its own.

MR. GRAHAM: When you buy gas from others and hold back your own wells for reserves and emergencies, you wouldn't want those to be drained out?

A. No.

MR. GRAHAM: You would prefer, as a general proposition, a reasonably wide spacing?

A. That's right. A reasonably wide spacing.

BY MR. McCORMICK:

Q. From what different fields in the entire San Juan Basin are you now purchasing gas?

A. From the Fulcher Basin. From the Barker Dome, Ute and Kutz Canyon area.

Q. Does your own company have production in any of these fields?

A. In all of them.

Q. In all of them?

A. Yes, sir.

Q. You have no acreage in Blanco?

A. None that I know of at this time.

Q. Tell the Commission what the spacing pattern is in those other fields.

A. I am not too much up on that, on the spacing of these fields. I have nothing to do with that part of the operation. I think--I just don't know.

Q. Do you know what it is in the Barker Dome?

A. I believe it is mile spacing.

MR. SCHULTZ: There is no spacing at Barker

Q. Do you know what the actual pattern is up there that has

been practiced?

A. A Well to a 640.

MR. MORRELL: Mr. Schultz, your statement should be qualified.

MR. SCHULTZ: That is what we would like to have.

MR. MORRELL: In the Barker Domeyou have a 160-acre spacing in the shallow Dakota formation and a 640-acre spacing, as arranged with the Geological Survey, for your Paradox production, which is found at a depth of approximately 9,000 feet.

BY MR. McCORMICK:

Q. How much gas is your company presently buying on the average per day from the San Juan Basin?

A. Well, we have already had a 32,000,000 peak day this year. Now, I don't know what it will run, but we will run close to 60,000,000 this year.

Q. Average daily?

A. Not average, but that will be our peak. It has been governed a whole lot up to now by pipe line capacity. I think we are getting out of that difficulty now.

Q. Would you say the average would be as much as 40,000,000 a day in the winter months?

A. Yes.

Q. Over the year?

A. Yes, I think it probably will average 40,000,000.

Q. Is there any other pipe line, is there any other purchaser of gas in the San Juan Basin besides your company at the present time?

A. Yes, there is some gas bought for Aztec and Durango, Colorado. There is a little going up there.

Q. To serve those towns?

A. Yes.

BY MR. BARNES:

Q. Mr. Cole, do you feel that the demand or need for gas at the present time like the need for oil is increasing to the point where it is unable to prove up reserves and get the gas into the market as fast as possible? Do you believe the demand is in some cases exceeding the supply?

A. Yes, I think the demand is exceeding the supply, especially here. Of course, the supply is all right, but the pipe line capacity is too small. Has been up to now.

COMMISSIONER SPURRIER: Does anyone have any further question of Mr. Cole?

BY MR. MORRELL: I would like to ask Mr. Cole a question. On this market situation, you state that you are ready, willing, and able to lay a pipe line into the Blanco area?

A. Yes, sir.

Q. For the record, do you consider that the presently drilled and completed wells, and the presently developed production, is sufficient to warrant a pipe line at this time?

A. Well, I feel that it is.

Q. So that your laying the pipe line will be dependent only upon availability of the pipe?

A. Yes, sir.

COMMISSIONER SPURRIER: Mr. Cole, do you think that with proper spacing that proration will actually be affected in the Blanco field?

A. I couldn't answer that question. I haven't checked into that. Others have in my company, but I haven't.

COMMISSIONER SPURRIER: Well, you have said, I think, that your company does take prorata even to the point of shutting down your own wells, and you wouldn't vary from that scheme

at Blanco?

A. No, we would do that.

MR. McCORMICK: Would it make any difference to your company whether it was 640 or 320 spacing?

A. Well, it would make this difference, Don. Of course, we want enough gas to give us a supply through that pipe line always. In other words, we want to justify the pipe line.

COMMISSIONER SPURRIER: You feel the gas is there and you just want the spacing that will get it for you?

A. That's right.

MR. GRAHAM: And you want it to last a long, long time?

A. (No response)

MR. McLEAN: If 640-acre spacing would tend to discourage wells being drilled in that area, then you mean to say that you would not favor 640-acre spacing?

A. Well, if it tended to cut down production where we couldn't take it all--if it tended to cut down production where we need more gas, we would be against 640-acre spacing. We want the gas. We want the wells drilled to supply us with enough gas to meet our demand from the field.

MR. McLEAN: In other words, a 640-acre spacing rule would keep some of the owners from drilling in tracts, and you would not be in favor of that spacing?

A. That's right.

COMMISSIONER SPURRIER: Mr. Cole, we are getting pretty hypothetical now. Suppose that by 320-acre apacing you weren't getting the gas that you wanted, could you conceive of dropping back to 160-acre spacing or even 40-acre spacing?

A. Well, I tell you, you are getting into an operation of the field there that I, at the present time, would not be

interested in except to take the gas. Of course, if we need more gas, regardless of what it might do to the field, I am in favor of getting gas. I am the pipe line company. That is what you are asking.

COMMISSIONER SPURRIER: That's right. Does anyone have anything further?

MR. McLEAN: I would like to request the Commission to declare a ten minute recess.

COMMISSIONER SPURRIER: The Commission will grant a ten minute recess. Exactly ten minutes. And when we come back, let's be prepared to wind this thing up if we possibly can.

MR. McLEAN: We just have one further thing to offer.

(Redess)

COMMISSIONER SPURRIER: All right, Mr. McLean.

MR. McLEAN: I have an affidavit here, if the Commission please, which I would like to introduce in evidence as Delhi Oil Company Exhibit 2. I can have a witness identify it under oath if you care to. If you don't, I will just explain what it is.

COMMISSIONER SPURRIER: Go ahead.

MR. McLEAN: It is an affidavit signed by representatives of holders of a majority in interest of the working interests in oil and gas leases covering the Blanco field, stating their positions, and recommending a 320-acre spacing pattern, recommending the setting of surface pipe through at least fifty feet of the first hard rock formation, circulated to the top with cement, and installed in such a manner as to insure adequate protection against blowouts and cratering. Then, there are other recommendations in accordance with, I believe, numbers 3, 4, and 5 in the petition filed by Stanolind Oil

and Gas Company in this case.

COMMISSIONER SPURRIER: What is the basis for 320-acre spacing in this affidavit, Mr. McLean?

MR. McLEAN: All of the testimony that Delhio Oil Corporation has presented. We think it would be--it would promote the development of the field. We think it would be easier to establish 320-acre units than 640-acre units. We think it would be fair to all interested parties.

MR. McCORMICK: All of the persons who filed this affidavit are present, are they not?

MR. McLEAN: Yes.

MR. McCORMICK: I don't think the affidavit can properly be received unless other interested parties would waive its being received by the Commission because they have the right to cross-examine.

MR. SETH: Everybody signing it has testified?

MR. McCORMICK: Not everybody.

MR. SETH: Well, Mr. Florance has been testified for. If they can get together on an affidavit of this kind, they can get together on a unit agreement.

MR. McCORMICK: Do you object to this affidavit being received in evidence, Mr. Seth?

MR. SETH: We don't object, and we really don't think it amounts to anything.

MR. MORRELL: Would the Commission read the signatures on the affidavit for the general information of those present?

(Mr. McCormick reads the signatures on the affidavit.)

COMMISSIONER SPURRIER: In view of the fact that Mr. Seth for Stanolind Oil and Gas Company does not object, the Commission will accept the affidavit as presented. Now, is there anyone

else to be heard in this case? Mr. Morrell, it would be a strange case if you didn't have a few words to present.

MR. MORRELL: Well, I would like to present a few remarks as a friend of the court.

COMMISSIONER SPURRIER: I am not being facetious, Mr. Morrell, except for a little humor.

MR. MORRELL: It is good to inject a little humor into these meetings.

COMMISSIONER SPURRIER: I think so.

MR. MORRELLL: I would like to enter into the record of this case excerpts from a letter dated September 17, 1948, addressed to the operators of the Blanco area. I will enter a copy, of which you have received one as the Secretary of the Commission. (Marked as Morrell's Exhibit A) By this letter I called a meeting in the office of the Oil Conservation Commission in Santa Fe on October 1 to discuss the subject of establishing a uniform spacing of wells in the Blanco area. In that letter I stated that consideration should be given to a wide spacing pattern initially so that the extent of the reservoir may be more readily determined. At the same time, provision could be made for a closer spacing pattern as may be needed as essential reservoir data is obtained. The letter also referred to the fact that several parties had informally reviewed with me the possibility of formulating a unit plan for the development and operation of the Blanco area. At that particular meeting the majority of the operating interests of the area who were represented were in favor of the 640-acre spacing. Since that time, there has been a change of minds, as expressed by the testimony presented before the Commission. I would like to state this: so far as

the policy of the Geological Survey is concerned, inasmuch as approximately eighty-five per cent of the area under discussion is Federal lands, that we encourage the greatest and quickest development of this area. That is true for both oil and gas. Now, the determination of what is economical is a matter of discussion, and is primarily the subject being discussed before this Commission. So far as this office is concerned, we were wondering as to whether or not some operator would start a 160-acre spacing in this area, and in order to forestall such a spacing pattern until the reservoir was demonstrated capable of that spacing, we called the meeting of October 1. At which time, no definite commitment or agreement among the operators could be obtained; and it was suggested and requested that they present the matter to the Commission for an order under state law. We could control the spacing on the Federal acreage, but we could not on the state and fee acreage. Consequently, although the state and fee acreage were a minority, they held the key to the situation. No testimony has been given for 160-acre spacing. In view of the few facts known now of the production at depths of approximately 5,000 feet with additional open flows in the neighborhood of four million per well. We recognize considerable merit to the various contentions made before the Commission. There are advantages both for the 640 and 320-acre spacing. As to the merits of each, the Survey endeavors to recognize the rights of all parties. Both the individual operators as well as the large companies. And we endeavor and are in favor of working out a spacing pattern as well as all other matters concerned with this that is most mutually beneficial to all parties. The structure at Blanco as given in

the testimony is a monocline. The Mesaverde is essentially conformable to the Pictured Cliffs. To some degree there is a marked similarity to conditions in the Fulcher Basin and Kutz Canyon. And the testimony has made comparable reference--reference to comparable data. In the Fulcher Basin and Kutz Canyon we had the problem a year ago of 40-acre spacing. On the basis of an application and testimony by Southern Union Gas Company a well spacing pattern was fixed by the Commission for 160 acres, and we were dealing with depths of 2,100 feet and initial productions according to the testimony, to the best of my knowledge, ranging from approximately 400,000 to a million and a half a day. On that basis, I would tend to compare 40-acre spacing in Fulcher Basin and Kutz Canyon to 160-acre spacing in the Blanco area. A considerable bit of testimony has been given as to the difficulties of communitization. As I brought out in a question to Mr. Schultz that regardless of 320 or 640 there is going to be considerable communitization required. There are very few locations that are on the same basic lease that would fall within these spacing patterns. While I am on the subject of spacing patterns, whatever is established, should be set up by the Commission, in my opinion, by a plat, showing the exact outline of the drilling units, and their exact location on the ground with the exact location of the well. In either a 320 or 640 spacing, the Survey would concur in the position expressed by Stanolind in allowing a leeway of 330 feet from the center of a 160-acre legal subdivision. The necessity for such a plat was demonstrated in the case of the Mid-continent Petroleum Company in the Crossroads pool on which the Commission has established an order for 80-acre spacing

for the development of oil. That plat showed the location of the 80-acre drilling units, together with the location of each well. Such a plat would be necessary on either type of spacing the Commission might set. A 640 has an advantage of being square in shape. It is easier to describe and from a legal standpoint can be more readily accepted as to equidistant offsets. The equidistant offset feature might sound a little odd in view of the fact that the proposed location would be in the center of the NE¼ of the section. However, cases before the state Supreme Court of Oklahoma and the United States Supreme Court have upheld the right of the states to exercise the police power and to state a location which in their opinion for that purpose would be acceptable for equidistant offset purposes. Communitization will require the signature of operating interests so far as public lands are concerned. Overriding royalty interests may sign if they so desire, but the department holds that that is a matter of relationship between the lessee and his overriding royalty interests. It is true that in a 640 you would have more interests to be signed up than in a 320, but you don't eliminate that objection by a 320. You do tend to reduce the number involved for each well. I would like to interpose a serious objection to the less than minimum surface casing requirement testified to by Mr. Silver and incorporated in the affidavit submitted to the Commission. The obligation of the operator for development of oil and gas is not only for the convenience to him to reduce his expenditures in the drilling operation, but he also has the legal obligation to protect the other parties who might be directly or indirectly affected. Certainly, in the arid and semi-arid regions of New Mexico

everything should be done for the protection of water. If we have artesian water in this area in depths of from seven to 1,100 feet over the general area, and we may not find water sands carrying water at depths of 50, 100 or 150 feet, those shallow sands nevertheless are potential polution sources. If the artesian waters are not sealed in such a manner that definite assurance is given for permanent separation. To that extent, I would favor a surface casing requirement more similar to that presented by Stanolind. That is merely a minimum requirement and doesn't prevent the operator from setting more if it necessary or desirable. The situation, too, with respect to well spacing as between 320 and 640 comes back to the question of limited market, a situation which we had in the Fulcher Basin and Kutz Canyon, and also tended to bring about a well spacing program. If we drill on a 320-acre spacing and have ten wells, which the testimony presented before this Commission indicated approximately one million a day available for sale, that would supply a ten million market. If the market wasn't increased, there is no further encouragement to drill additional wells. If additional wells were drilled and the market wasn't increased, you immediately get into a situation of having to divide that limited market to a greater number of wells so that the revenue obtained from each of them is reduced. We do have hopes, as Mr. Schultz has testified and of which all of us is aware, that with the construction of the San Juan Pipe Line Company line to California our market situation in the San Juan Basin area may change from one of limited market to one of almost unlimited market. There is another interesting point that Mr. Cole likewise touched on that might be taken into

consideration by the Commission in determining 320 versus 640. That we know from experience in connection with the transmission of gas for peak loads, the greatest number of outlets is desirable. By that I mean the greatest number of wells available for production. Because you cannot continue to increase the withdrawal from individual wells beyond a certain reasonable percentage regardless of any arbitrary 25 per cent that is put on for general conservation purposes. And in the Barker Dome the Southern Union and Delhi are putting back gas into the shallow formations so that they will have a greater number of outlets from which to take during peak loads.

MR. SCHULTZ: Just for the record, Delhi is producing no gas at all. All our wells are shut down.

MR. MORRELL: They are only taking from Southern Union wells at present. That is about the summation of my remarks. We will take no fixed opinion as to either 640 or 320. Taking the practical thing, we were inclined at first to favor the 640. We have got two opposing trends of thought. The main thing is to get development and get a market and put it on production. Whichever will accomplish that result, we are in favor of.

COMMISSIONER SPURRIER: Thank you very much, Mr. Morrell. I am sure that those remarks will help the Commission when they have to write this order.

MR. SILVER: I would like to ask Mr. Morrell some questions.

BY MR. SILVER:

Q. Mr. Morrell, when pipe is set and cemented at the top of the Mesaverde pay with rotary tools and mud back of the pipe, is there any circulation back of the pipe between the

formation?

A. So long as your mud remains at a level to hold back pressures. Good quality mud fluid in the laboratory will stay in suspension indefinitely in test tubes. But in a well bore we have formations that are very absorbent of water. Consequently you will have settling of mud behind the pipe unless you add additional mud every day. The point might be answered this way. That if the mudding job is perfect, there should not be, but if some rancher in the area should have some difficulties with water, and you had a well that didn't have surface casing to that zone, he is going to put his finger on you. It is a matter more of protection of your own interests as well as the others.

MR. SCHULTZ: If you are going to say 250, why not say 500?

A. We don't know what those zones are. I don't see the difference between fifty and 250.

Q. If you have got your surface pipe tied into a hard subsurface zone fromation, I don't understand the logic of why we should set on the side of 250.

A. I don't hold with the exact footage of 250, but I believe fifty feet is not sufficient.

Q. We set fifty feet into a hard formation. That might require 500 feet.

A. You might have fifty feet into a hard formation, but below that loose sand.

Q. You subscribe to a minimum stipulation of 100 feet of surface pipe?

A. I couldn't personally at this time subscribe to less than 150 feet, and I think that should be the subject of some further study.

MR. ENGLISH: May I say something there? Couldn't we cement the production string clear to the top? Wouldn't that do the job? Instead of running the other?

A. That doesn't answer the question Mr. Silver presented. His point is to save pipe. Your point would be to use pipe.

MR. ENGLISH: If you are going to have a production string, why couldn't you cement your production string from top to bottom and do away with the other pipe?

MR. SILVER: Cement is as hard to get as pipe.

A. In some areas you may find gas in the Pictured Cliffs of sufficient volume to warrant marketing by bringing connections to the surface. You should have sufficient surface pipe so that you could adequately control anything that you might meet, bore water and gas and other production, through surface connections. If you have adequate surface pipe, you might then come before the Commission and get permission to dually complete your well. If you don't prepare for those things in advance, you oft times lose them.

MR. MORGAN: On the use of surface pipe. The amount you set and amount you run is primarily for the protection of surface water. Secondarily, it is to insure the contractor who is drilling the well to be able to drill his hole to the depth to which drilling is desired. And the use of any given amount of surface pipe outside of protecting the surface water should be at the discretion of the drilling contractor who is handling the hole.

COMMISSIONER SPURRIER: Does anyone else have anything in the case? Well, now, gentlemen, you are all looking at your watches but I am going to hold you about five minutes more because I have a few words to say. We have an awful lot of

record to review when the Commission meets to write an order in this case. In the first place, I want to thank each and every one of you for your diligence in the work that you have gone through, and I want to give you a chance to do a little more work. You may submit to the Commission a proposed order in this case. It hasn't always been done in the past, but the Commission is always glad to welcome a proposed order. Now, I would like to mention another point. The Oil Conservation Commission is not sitting at any time to take a poll. We are not interested in ballots being cast. If we were, Southern Union would still have 40-acre spacing in Kutz Canyon. On the contrary, Southern Union presented evidence to us which we felt was proof that it wasn't economical in dollars and cents to drill wells on 40-acre tracts in Kutz Canyon. And the order that the Commission issues in this case will not necessarily be a poll of all your people who are interested. I hate to mention names, but Brookhaven Oil Company was at the outset of these discussions very much worried about the protection of what you might call correlative rights. Our statutes respect not the rule of capture, but the rule that you are entitled to what is under your particular bit of land. And I think that Brookhaven now feels that their correlative rights will be protected, and I could have told them that in the first place. Now, in this matter of protecting artesian water, we sometimes get ahead of the State Engineer, whose prerogative that is. Because we find it out first from you people who are drilling for oil and gas. And believe me we intend to protect that water in whatever measure is necessary to protect it. And if some of you people who operate in the San Juan Basin just look in the basin

around Artesia and around Hobbs and on up through Roswell, you will see we are very particular down there about our casing program through the artesian strata. I think that is about all I have. Again, I want to thank you and remind you that there is no decision to be made here. Every case that was heard this time will be taken under advisement until the rest of the Commission can review the testimony. I should like to request that all of you folks who have drilled and have any information from wells drilled in this proposed area in sofar as you can submit that information to the Commission, without divulging what you might consider secret geological information. I wish you would send it to the Commission because I think it will be helpful to us when we write the order. Now, if no one has anything further?

MR. ENGLISH: This artesian water we are talking about in the San Juan Basin is salt water.

COMMISSIONER SPURRIER: It is salt water?

MR. ENGLISH: Yes. It isn't the same as the artesian water at Roswell. You are trying to protect the fresh water, isn't that it?

MR. MORRELL: With enough surface pipe you could squeeze cement or add mud under pressure to prevent that water from going down into the Pictured Cliffs.

MR. ENGLISH: Or from coming up.

COMMISSIONER SPURRIER: Thank you, Mr. English. If no one has anything further, the hearing is over.

STATE OF NEW MEXICO)
: ss
COUNTY OF SANTA FE)

I, E. E. Greeson, Notary Public, hereby certify that the foregoing and attached transcript of the hearing before the Oil Conservation Commission of the State of New Mexico

is a true record of such hearing to the best of my knowledge, skill, and ability.

I further certify that I am the Official Reporter for the United States District Court for the District of New Mexico.

Dated at Santa Fe November 17, 1948.

E. E. Fallson

notary Public

My Commission Expires Aug. 4, 1952.