BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

SPECIAL HEARING

CASE NO. 330- 330-A

TRANSCRIPT OF PROCEEDINGS

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ADA DEARNLEY AND ASSOCIATES
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Morning Session

Thursday, June 24, 1954, 11:00 A. M.

MR. SPURRIER: The meeting will come to order, please. Does any one have a question of Mr. Weiderkehr? Mr. Howell.

MR. HOWELL: Ben Howell, representing El Paso Natural Gas Company.

A. W. WEIDERKAEHR,

having been previously duly sworn, testified further as follows:

Cross Examination by Mr. Howell:

Q Did I understand you yesterday, Mr. Weiderkaehr correctly, to say there was no connection between the Southern Union System and the El Paso Natural Gas Company System?

A No, sir, I said there was connection between your two systems. What I meant was our Lee County and our San Juan Basin System.

Q As a matter of fact, at the present time, by contract with El Paso Natural Gas Company, you are disposing of approximately thirty million cubic feet of gas per day that you are taking from wells connected with your system, are you not?

A I don't know what the figure is. It varies from ten to forty million a day.

Q By reason of contract between the two companies, in an effort to equalize their takes in the Mesaverde-Blanco Field, El Paso Natural Gas Company has been taking quantities of gas during your low market periods?

A They have been taking gas, although they took more gas during our high market period. They took more during the winter than they have during the spring.

Q By contract the El Paso has the right to take gas during your periods of low market?

A That is correct.

Q So a substantial part of your ability to operate the wells connected to your system is due to your ability to equalize your market demand by delivering some gas to El Paso isn't it?

A Mr. Howell, I don't quite understand you. You said a substantial part of our ability to operate our wells. You mean to maintain our load factor?

Q Yes, to maintain your load factor on your pipeline system.

A Yes, that is correct.

Q The contract that you made with El Paso is designed to equalize your load factor?

A That was its intent.

Q Mr. Weiderkehr, according to anyone of the combinations of seventy-five percent deliverability, which have been mentioned here, the weak wells will all receive an allowable of all they can make, won't they?

A Well, depending on where you say weak, but as I consider them, yes.

Q According to the estimates prepared by Phillips and introduced, and I refer specifically to Phillips Exhibit Eight, I believe it is--

A I think that is correct.

Q It is graphifically shown on the curves the line S, B, C, D, and E, that the wells with the weaker deliverability up to the extent of more than thirty percent would, under any one of those allocation formulas, have the same allowable?

A That is correct.

Q The tabulations which Phillips has presented here I think bear that out, showing that under any formula there are one hundred seventy-four wells of the group that they studied that would have an allowable of all they could make.

A I would have to look at another exhibit and see what that was.

Q I think you will find the pages below that Exhibit Eight show that.

MR. FOSTER: I believe you find that on Exhibit Six.

Q Exhibit Six also shows that on the twenty-five percent acreage and seventy-five percent deliverability that there would be one hundred eighty-one wells of those studied which would be in the category know as "limited wells".

A That is right.

Q Mr. Wiederkher, in your operations, as well as El Paso's, the weaker wells will continue during the year to make what they can make, that is correct, isn't it?

A Yes.

Q You would expect that to be less than the deliverability of their well?

A That is correct, yes.

Q And that is not as a result of any pipeline problems, but it is the problem of the operator of the well to get his well to put the gas into the pipeline, isn't that true?

A That is one of the problems, yes.

Q And the under production from a well is in a limited status must be redistributed and alloted to, allocated to the well which has the deliverability to make it?

A That is correct.

Q Regardless of anything that the pipeline company may want to do?

A Right.

Q When you increase the number of the limited wells you continue to increase the number of wells whose actual production will be less than their deliverability, do you not?

A Yes.

Q And you continue to increase the volume of gas that must be allocated on a deliverability basis?

A Yes.

Q Now, I believe you recommended that in your study, you thought the best factor was fifty percent acreage plus fifty percent acreage times deliverability?

A Yes.

Q What, in your opinion, would be the next best of any of the formulas that have been advocated?

A If I can qualify my statement, and assuming that the Commission would see fit to impose a minimum and a maximum allowable, I would say that in all probability seventy-five percent acreage times deliverability and twenty-five percent acreage would be my next choice.

Q In connection with the minimum, I believe the figure that you used was what--three hundred fifty thousand?

A Yes.

Q And if that three hundred fifty thousand figure be used, there would be in excess of one hundred eighty-one wells that couldn't make it, isn't that true?

A Yes, but you would give them a chance if they could.

Q If the twenty-five percent acreage plus seventy-five percent acreage times deliverability be used, why these wells would still get an allowable that they couldn't make, wouldn't they?

A Under the present, under the supposition that the market and availability of gas were the same as those described here, yes.

Q So that the weak wells generally are going to make what they can, and that is all they can make.

A As long as you have some acreage factor, yes.

Q That is right. Now then, Mr. Weiderkehr, there are times when the demands over a period of time require that the gas be produced from the wells that have the productive ability, isn't that so? A Yes.

Q What is the highest deliverability that you know of any well that has been completed?

A It seems to me like it was somewhere around a calculated deliverability of around seventeen million.

Q Around seventeen million. Now in connection with the studies, I think Phillips Exhibit Three shows one well with seventeen million and one with fifteen million, is that--

A That is as I see it in their Exhibit Three, yes.

Q All right now then, referring to their Exhibit Three again, isn't it a fact that there are only thirteen out of the entire three hundred fourty-six wells listed that have a calculated deliverability in excess of three million cubic feet per day.

MR. FOSTER: Is counsel asking the witness to state what Exhibit Three shows?

MR. HOWELL: Yes.

MR. FOSTER: I think the exhibit is the best evidence of that.

MR. HOWELL: I counted thirteen.

MR. FOSTER: What I am saying is the exhibit shows on its face--

MR. HOWELL: That is quite true. With the Commissions permission I shall proceed--

MR. SPURRIER: You may.

MR. HOWELL: With the question.

Q And I believe if you look at the number of wells that have a deliverability in excess of two and half million, you will see that the total is twenty-one wells.

A Correct.

Q So that your proposal of a maximum of two and half million for allocation actually affects but a small number of the wells in the field, is that right?

A A small number of the wells that are presently completed, yes.

Q That are presently completed. But it does cut down the ability to obtain a substantial proration of the gas when needed.

A I do not feel so. I feel that during times that we need the gas, we will take them in excess of two and half and we will take care of that at the off-season period.

Q Whenever one has to take under production and redistribute it, that requires quite a little bit of clerical work, doesn't it?

A Yes, it does.

Q The more times that that process has to be gone through with, the more clerical work there is on the Commission of it takes over the proration here and adopts a proration formula.

A Very definitely.

Q And the formula which, if adopted, originally would come nearest to the formula which will result from a continued reallocation of under production is actually the less clerical work and the most practical, is it not?

A I believe that is correct.

Q If you take a formula that has a hundred eight-one wells that are in the limited category, there is much less work in reallocation than a formula that has got three hundred forty wells in the limited category?

A That would be true until such time as they were all set on a chedule where they produced their market demand and then were not bothered at all. They could be set aside much easier marginal than your oil are done, and then you wouldn't have the paper work involved after the first balancing period, after you found out which wells were going to be in that cateogry.

Q Won't you expect the wells, on a limited basis, to continue to decline? A Yes.

Q And that over each balancing period as the reserves under that well are produced, wouldn't you expect to find that well continually building up under production.

A I state that I thought they should be set in a separate category and not given an allowable at all. You would take the allowable from the wells that were on you allowable schedule only and allocate that production. Your marginal would be set to the side and would have no allowable. They would be allowed to produce what they could and you have no paper at all.

Q Each time that you had a balancing period with those weak

wells they are going to continue to grow weaker?

A That is right.

Q The amount of gas that you set aside for those wells regardless of how you compute it, you would expect to be less each six months period than it was for the preceeding six months?

A Apparently, Mr. Howell, you balance differently than I do. I don't consider those at all in the balancing work I have done. I take the actual production from the wells on you allocation schedule and reallocate that amount of gas. The other wells I don't bother with them at all. I take the total production from wells which are on your allocation formula and reallocate gas back to them on the basis of whatever formula I am using and carry an overage and underage on them, but I don't consider the overage or underage on these other wells because I don't carry them on my allocation schedule.

Q If they are limited wells they still have to be given some character of allowable, don't they?

A They are allowed to produce what they can, but they would not necessarly be placed on your over and under production report.

Q The gas produced from these wells have to be considered in distributing market demand, doesn't it?

A I wouldn't say so far as allocation formula was concerned.

Q You would just throw out all the gas produced from the marginal wells or wells that are limited--lets not call them marginal.

A No, I wouldn't throw them out, but I would carry their production separately and I wouldn't allocate it.

Q You wouldn't allocate any underage of their production?

A No. I have done that, Mr. Howell, before and it works quite

satisfactorly. If you so desire, I will be glad to show you the way I did it.

MR. HOWELL: You will have to do that sometime when we are not taking somebody else's time.

MR. SPURRIER: Anybody else have a question?

MR. GORHAM: I just have one or two questions.

By MR. GORHAM:

Q Mr. Weiderkehr, examining this particular cross-section that you have presented yesterday, before the commission--

MR. SPURRIER: What exhibit is that?

MR. GORHAM: Exhibit Number Four. You have pointed out that there could be a very large variation in gross sand pay in the so-called Mesaverde Group?

A That is correct.

Q Would you kindly state what you believe the maximum difference could be from a gross-sand viewpoint?

A I believe I read that into the record yesterday. I believe I said somewhere in the vicinity from seven hundred fifty feet over to approximately one hundred fifty feet or sixty feet.

Q On this cross-section also you have shown the top of the first major sand in the so-called Mesaverde Group and connected them?

A That is right.

Q Would it be possible to say that that particular point would be indicative of a structural condition of the Mesaverde Group?

A I don't believe the top of the first main sand under the Pictured Cliff is a structural relationship. I think you might find a structural relationship on the bottem of the Mesaverde series.

Q In your opinion, is this particular sand the equivalent of this particular sand? The upper lobe sand in El Paso Grambling Number Two, and the main lobe of Delhi Number One Turner?

A I do not. I correlated them that way because simply this sand, upper sand which appears to be the small amount of sand in Delhi Number One Turner, to me did not correlate with the sand in El Paso.

Q Is it true to state, or difficult, or relatively impossible to correlate sand from one well to another over the entire field in the Blanco-Mesaverde Group?

A Over the entire field, yes.

Q Is it possible that sands exist in one well which do not exist in the next well?

A Yes.

Q Is it also true that within the gross sand interval of the Mesaverde Group, that in computing reserves we have to use the net effective sand. A Right.

Q Is it also true that in the Northwest portion of the Basin where we have a large percentage of gross sand that the net effective sand would have to be extremely small on the basis that the upper lobes of the Mesaverde group have water and do not have produceable reserves?

A The first question, part of your question, I would say yes. The last part I wouldn't want to vouch for it because I don't know what the charateristics of El Paso I-Turner, or El Paso 2-C Grambling pipe is set above the section. I have found that to be so in wells we have drilled.

Q It is difficult or impossible, in your opinion to trace all

sands from well to well?

A It would be impossible.

Q Getting back to the one other cross-section for a moment, you have pointed out there that although there are perhaps, this is Exhibit Number Two, you have attempted to point out here a general relationship in gross sands on that particular section?

A That is correct.

Q That is correct? A Yes.

Q In your opinion could the net effective sands vary from one well to another?

A To a certain extent, yes.

Q To a certain extent? Is it possible that since sands cannot be readily traced from one well to another that in fracturing the well either with a shot or with a sand oil-frac that additional sands which are not actually present at the well bore would have access to the well bore?

A Yes, I think so.

Q Therefore, it is possible that this extreme variation in here could be accounted for the fact that in the process of fracturing the well it opened up additional recoverable reserves? Is it possible?

A It is possible--read that question. (Question read)

A It is not impossible that the entire amount of difference could be caused by additional reserves, no.

Q The entire amount. Would you state that a large increase or increases in deliverability in that particular well could be accounted for by the opening up of additional recoverable sand reserves?

A I agree that a portion of it could be, yes.

MR. GORHAM: That is all.

MR. SPURRIER: Anyone else? Mr. Smith.

By MR. SMITH:

Q Mr. Weiderkehr, in order to point up our discussion, I would like to ask you one or two questions. I believe that your discarding deliverability as a test of recoverable reserves was based upon--I guess I had better go over to the board. On Exhibit Three, and it wasn't quite clear, or it wasn't quite clear to me, exactly the basis for your conclusion.

A Mr. Smith, if you would look at the area covered by this particular cross-section, you would have found that all these wells lie within a nine section block. It is my opinion that it would be impossible for sand conditions in the Mesaverde Field to change so in that short a distance to give the variations that we get in deliverability capacities of these wells. The furtherest well apart here could be only the square root of eighteen, you must not forget that.

Q I don't know. That doesn't account for the graphs, or the chart, that arrangement, on the logs.

A The logs are simply to show there is some correlation between the sands in the individual wells and there is no great variations in sand between wells of mediocre deliverability capacity, and wells of large deliverability capacity.

Q You don't think there is a direct relationship, but there is a relationship between deliverability and reserves?

A There is some relationship, yes.

Q Going to your formula, I believe you stated that acreage would definitely be unfair as a strict test.

A I do say so.

Q That the only known factor we have present is deliverability because it also assumes some use of pressure in protecting the deliverability?

A It does.

Q That is the only know factor we have that could possible be used?

A Well--

Q Is there another known variable factor that can be used?

A Yes, we have the pressure that Skelly has recommended, we have acreage and we have deliverability.

Q I had references to variable factor. I don't think your pressure variable is quite so much.

A No, but it does vary.

Q You also use pressure in determining deliverability?

A Yes.

Q Also, I note, that you recommended basis gives a little more weight to acreage than it does to deliverability?

A I don't think so, Mr. Smith.

Q You take fifty percent of the total allocation, isn't that right, and give the acreage?

A That is right.

Q Then you go back in and take fifty percent of the remaining, and it is acreage times deliverability.

A All right, but the only difference in acreage times deliverability might be the variation in the size of your unit. If you drill on 320, strictly 320, you would need the acreage in your deliverability.

Q There are other sized sections?

A There are some other sized sections.

Q Then as I understand your testimony, you think that you have a fifty-fifty division of your acreage in your prorations formula?

A Mr. Smith, I will frankly say that I think that is the best division we can make. I don't know that is exactly the correct one, but in my opinion it is the best one we can make.

Q How much of the differential in the allowables is contemplated, or is that too general a question to answer?

A How much difference?

Q Differential.

A The way I stated it, it would be from zero to two and half million.

Q Anything over two and half million, stops at two and half million ?

A Stops at two and half million.

Q If you consider that on 75-25, what would the differential be?

A I don't know what it would be.

Q You did know about the fifty-fifty?

A The reason, on my fifty-fifty I suggested that we put a suggested allowable, another two and half million.

Q Are you going to do so if the Commission takes your second choice?

A Yes, I would say there is definitely a need for a maximum allowable.

Q For all practical purposes then, the 75-25 would be just as effective?

A I don't think just as effective. I think I made a statement

in response to Mr. Howell's questioning earlier that that would probably be my second choice. I do not think it would be effective because I think you are giving too much weight to deliverability, which does not have enough relationship to reserves to justify it going to seventy-five percent of your allocation formula.

Q If you had the maximum allowable on there it wouldn't make too much difference?

A No, you are getting your protection from the maximum allowable.

Q 75-25 wouldn't materially alter the allocation among the average wells in the field?

A I don't know just how that would affect them, but I don't think there would be an awful lot of difference.

MR. SMITH: Thank you very much.

MR. SPURRIER: Anyone else? Mr. Davis.

Quilliman Davis representing the Aztec Oil and Gas Company.

By MR. DAVIS:

Q In connection with your testimony yesterday Mr. Weiderkehr, you referred to an average Mesaverde well has a cost of eighty thousand dollars, and figuring the pay-out also at six years.

A That was at the rate of three hundred fifty thousand cubic feet of gas a day, yes.

Q In that computation did you take into consideration interest on your investment, taxes, operating costs, and other factors, or was that straight seven-eighth's of the of the gross working interest?

A It was straight seven-eighth's of the gross production.

Q So that if you add in what you know would be the additional expenses you would have a longer pay-out?

A You would have a longer pay-out, right.

Q In your opinion, is there any doubt that the Blanco-Mesaverde Pool is a continuous reservoir?

A No.

Q In other words, it is in your opinion, a continuous reservior?

A It is connected.

Q In connection with this committee meeting that we have referred to from time to time, have you attended most of those in connection with the setting up of proration of the Blanco-Mesaverde Pool?

A I have.

Q What has been your position for the proper allocation formula for this Pool during those hearings?

A I have contended since the meetings began that the proper one would be the one I have proposed here.

Q In other words, all the studies and testimony that has be submitted, you have not changed your mind? You still feel that fifty-fifty is proper?

A I surely do.

Q In connection with one of Mr. Howell's questions, Mr. Weiderkehr, about this extra clerical work on the Commission, I don't know that it is important because the Commission realizes that they have clerical work anyway in any formula. Would there be a great deal of extra work involved, in any f these formulas, would there be a difference if they adopted any formula for proration in setting up any that would be relatively simple as far as allocation is concerned?

A There would be some differences, yes. Once it is set up

it would run off smoothly. Setting it up might be a problem.

Q Now, referring to Aztec Oil and Gas, you referred in your testimony yesterday that Aztec had quite a bit of acreage and had an option to acquire additional acreage and we appreciated the testimony. Has there been a complete divorcement of Aztec from Southern Union Gas Company?

A There has been.

Q In other words, there is no relationship between the companies except for a normal board membership and things of that sort?

A That is correct.

Q Do you think there is a need for proration of gas in the Blanco-Mesaverde Pool?

A I do.

Q Why?

A Because of inequitable withdrawls as between wells. I feel that there has been drainage between off-set wells due to the fact that part of the wells are producing at higher yearly load factors than others.

Q Which is due largely to the difference in market conditions of the Pool?

A That is right.

MR. DAVIS: Thank you.

MR. REES-JONES: Mr. Rees-Jones, representing Delhi.

By MR. REES-JONES:

Q Mr. Weiderkehr, as I understand it, we are all here trying to get a fair and equitable proration formula, is that correct?

A Right, I hope so.

Q We haven't all agreed on the facts concerning this reservoir, but it is our purpose to reach a formula which can be applied to all wells in the field, is that right?

A That is correct.

Q And it is your opinion that one hundred percent acreage would not be proper by itself or one hundred percent deliverability would not be proper?

A That is correct.

Q So you have reached the opinion, Mr. Weiderkehr, that giving the proper weight to acreage and the proper weight to deliverability that a fifty-fifty formula would be proper for the wells in this field?

A That is my opinion, yes.

Q You have mentioned that you would want a minimum to provide an insentive for drilling of wells in the Blanco-Mesaverede Pool?

A Yes.

Q I believe your minimum is three hundred fifty?

A Only in my recommendation that it. If the recommendation as far as allocation is concerned is not accepted, I still would like to see a minimum.

A Correct.

Q Referring to Phillip's Exhibit Number Seven under a fifty-fifty formula there is, in effect, a minimum, is that correct?

A There is, five hundred fifty-seven.

Q My understanding it was five hundred fifty-seven would be the minimum.

A Correct.

Q Wells below that would be limited wells or non-prorated

wells? A Yes.

Q Is that correct?

A That is my understanding.

Q So under--

MR. FOSTER: I want to object to the witness stating a conclusion that follows from the exhibit. There would be no non-prorated wells in the field once proration becomes effective. All wells would be prorated. I just want to make an objection that the exhibit speaks for itself. Whatever it says, it says. I object to the conclusion of counsel here that that is what will happen when we are looking at that exhibit.

MR. REES-JONES: I used the term non-prorated because it in my opinion means that a lot more to the people who are in there thinking, than the term "limited." I say "non-prorated" meaning wells that under the proration formula are limited only by their ability to produce their deliverability.

Q To continue with the questioning, Mr. Weiderkehr, you are the only witness here who has suggested a maximum, is that not correct?

A I believe that is correct.

Q We are trying, however, to get one formula which will apply to all wells?

A I am trying to get one that will apply to all wells but not necessarly to all people concerned.

Q Are we discussing wells here or people? It was my understanding that we were prorating as among wells.

A You brought up the people.

Q All right, I will stand corrected if I should be corrected. What is your reason for a top maximum of two and half million, Mr.

Weiderkehr?

A I believe the record yesterday will state my reason. I said that it is not, it is my opinion, that there is in no one well in excess of twice the reserves of an average well, which would mean, insofar as I am concerned, that for each well to be prorated equally then no well should be allowed to produce in excess of twice the average well. I further explained that as an insentive for operators to develop better techniques, to develop better completion practices, to increase the capacity of their wells, that I thought there should be some factor added to this two times the average which would provide that insentive. Therefore, I suggested three times the average, which would be approximately two and a half million.

Q What is the average?

A I suspect that the average, according to all the figures I have seen, is eight hundred thousand cubic feet of gas per day.

Q Are we talking about recoverable reserves or gas in place?

A I believe that proration is to take care of the gas in place.

Q In considering a proration formula we are not to consider whether or not a certain amount of gas in place will not be recovered?

A I think that we need to take that into consideration.

Q In other words, we consider both?

A We consider--

Q Gas in place and recoverable gas, is that right?

A Right. But we are prorating gas in place I believe.

Q Your fifty-fifty formula, as you have stated it, gives weight to acreage and weight to deliverability within a certain group of wells? A Right.

Q If the fifty-fifty formula is all right for the geese, be-

tween three hundred fifty thousand and two and a half million, why is it not all right for the gander above two and a half million?

A I thought we were talking about gas wells?

Q All right, you do not care for an analogy, I will change the question and put in the wells.

A I would appreciate it if you would.

Q I stand corrected a second time from the witness. You care to answer the question?

A If you put it in the correct form I will answer the question.

Q I think the question was correct as I asked it. If your formula of fifty-fifty is proper for the wells between three hundred fifty thousand and two and a half million, why is it not proper for the wells above two and a half million?

A For the reason I stated before, that we do not have a formula which is exactly correct. At least, I don't think any of us know what the correct formula is. I gave you a reason for putting the top of the wells. I think that should answer your question.

Q In other words, we are not to have one formula for all wells, is that right?

A We are having one formula.

Q We are to have arbitrary groupings of wells? Do you care to answer the question, Mr. Weiderkehr?

A Just a second. I don't know whether you would call it an arbitrary grouping of wells or not.

Q Your premise for two and a half million maximum is based on the fact that you say no well in the field has tweice the reserves of any well?

A I say there is no well that has any excess, in excess of

twice.

Q If that premise is wrong, you would go to some figure higher than two and a half?

A That is correct.

MR. REES-JONES: Thank you.

MR. SPURRIER: Anyone else? Mr. Smith.

By MR. SMITH:

Q I want to make sure that I understood Mr. Weiderkehr, that his entire testimony is predicated upon giving a proper apportionment to the reserves in place and not the recoverable reserves?

A I think we are supposed to be prorating reserves in place.

Q Are you familiar with Section 13-A of the Oil Conservation Commission--

A No, sir, I can't quote it. I have read it but I don't recall exactly what it says.

MR. SPURRIER: I don't believe this witness qualified as a lawyer, at least under oath.

MR. SMITH: I am not asking him a legal question.

A I will be glad to answer Mr. Smith's question when he brings it out.

Q The rules, regulations or orders of the Commission shall, so far as it is practicable to do so, afford to the owner of each property in a pool the opportunity to produce his just and equitable share of the oil or gas, or both, in the pook, being an amount, so far as can be practically determined, and so for as such can be practicably obtained without waste, substantially in the proportion that the quantity of the recoverable oil or gas, or both, under such property bears to the total recoverable oil or gas or both in the

pool, and for this purpose to use his just and equitable share of the reservoir energy. In view of the section of the statute that I just read to you, would you be inclined to change your conclusions?

A If I amy look at this a moment. If you will restate your question, I will reanswer it.

Q Mr. Weiderkehr, you have before you Section 13-A of the Oil and Gas Conservation Act, State of New Mexico, which I asked that you read with particular attention to the definition of the oil and gas in place as being the recoverable portion thereof.

A I have read it.

Q And state whether or not in view of the direction to the Commission of the manner in which they shall prorate gas, whether or not that direction would chage your conclusions in view of your previous statement that you think the oil and gas in place is the basis upon which we should make that determination?

A I guess I would have to restate my answer to say that it is the Commission's job to prorate gas that can practically be obtained without waste.

Q In other words, recoverable reserves?

A If they are the same.

Q Well, we won't quibble legality. Assuming that those factors are the law?

A Then we should be prorating recoverable reserves.

MR. SMITH: Thank you.

MR. GRENIER: I have a few questions on redirect examination, Commissioner.

MR. SPURRIER: Mr. Macey has some questions.

By MR. MACEY:

Q Mr. Weiderkehr, in connection with your studies in the Blanco-Mesaverde Pool, would you agree that there are relatively large areas of undeveloped acreage still to be drilled in the pool?

A Yes, sir.

Q Would you agree that those areas predominately are areas of potentially low deliverability, low potention?

A Most of them, yes.

Q There are probably some areas where you would have good wells or relatively good wells, most of the area that has yet to be developed is relatively poor acreage?

A As we know it now, it is poor acreage, yes.

Q At the present time there is no proration formula being followed in the Pool, is that right?

A No, sir.

Q And if the present system of no prorations were continued, do you think that the entire pool would be devloped, or a greater percentage of the entire pool would be developed than if a proration formula such as you suggested were put into effect?

A I believe that a proration formula, particularly one with a minimum allowable would make the operators prone to develop areas as that right now might not be economically justifiable.

Q Suppose that the areas which under the present system might not be developed, suppose we went along on the present system and didn't prorate it, what would happen to the gas out in the areas?

A I think a portion of the gas would be lost. Non-recoverable.

Q In other words, it is your belief that unless gas is prorated in the Blanco-Mesaverde Pool there would be a tendency to decrease the total recovery of gas from that Pool?

A Yes, I think so.

Q Don't you think that is wasteful?

A Yes, you are wasting energy and reserves.

Q To go a little further in prorating that gas under the proposed formula, the proposed minimum and maximum that you have suggested here, ou think that correlative rights are being protected?

A Insofar as the infromation we now have, I believe so. It might be adviseable to look the situation over when more information comes along. Right now I think that is the best we have.

MR. MACEY: That is all I have.

MR. SMITH: Might I have one question, if the Commission please?

By MR. SMITH:

Q I am not sure that your testimony covered this particular point. In the event that it is necessary, or the directions of the Commission is to prorate recoverable reserves, isn't there a closer relationship between deliverability and recoverable reserves than there is between deliverability and reserves in place?

A With no time element, no sir; and there is no time element in here.

Q Assuming the time element ot be constant for both the reserves in place and the recoverable reserves?

A In a constant time, yes, there would be more gas recoverd from a high deliverability well than a low deliverability well.

MR. SMITH: Thank you.

MR. SPURRIER: Anyone else? Mr. Griener.

By MR. GRENIER: Redirect Examination

Q A few more questions on redirect examination Mr. Weiderkehr,

you have suggested, I believe as part of your formula, a minimum allowable and it is also been pointed out that each of these suggested formulas, they range from twenty-five percent acreage to plus twenty-five percent acreage times deliverability on down to one hundred percent acreage. Each has the effect of producing a number of limited wells, varying number and varying total productive, is that correct? A Yes.

Q As to your formula, I believe that it was your interpretation on the Phillips Exhibit Number Seven, and subject of course, to the fact that the exhibit speaks for itself, but you interpreted that exhibit as indicating that a fifty percent acreage and fifty percent acreage times deliverability formula would mean that any well having a deliverability of less that 557 would be a limited well and therefore have an allowable substantially equal to its ability to produce?

A Under the assumption, Mr. Grenier, that the information from which this tabulation was made is correct and is consistent.

Q That is right, assuming the correctness of the Phillips' tabulations, they come out and indicate that your three hundred fifty recommended minimum is less than what the practice operation of the formula would produce anyway?

A Yes, under the present operating conditions.

Q That is just the point I am coming to, that that is based on the assumption of the present relationship between total field deliverability and total field market, is that right?

A That is correct, and total wells.

Q What if either more wells were drilled without a corresponding increase in market, or what if an increase or, pardon me, a decrease in market to a material extent, would this 557 point remain the

same?

A No, it would not.

Q Which way would it move?

A Down, under the assumption you made.

Q So that is what you are doing in recommending your three hundred fifty minimum, is to simply assure that the five hundred fifty-seven point doesn't move down too far, is that correct?

A That is correct.

Q And you recognized that so long as conditions remain substantially as they are now as respects the relationship of market to deliverability, that there wouldn't be any impact from the minimum, it is sort of an assurance factor rather than anything else, is that right?

A That is what it amounts to.

Q I maybe misunderstood either what Mr. Howell asked you in one question, or what your answer to it was, but I believe he asked you if it wasn't true that increasing the acreage factor in one of these additive type formulas, he asked whether that would not tend to increase the number of wells which would not be producing their allowable. As I understood your answer it was that that wasn't so. Is that so?

A In answer to your question, Mr. Grenier, prior to that I believe Mr. Howell made the statement that some of the wells would be off a part of the time and it was in that line of thought that I answered his question, yes.

Q The background of that question had been with respect to limited wells, had it not, as that term was defined by Phillips?

A Yes.

Q He pointed out that those limited wells, because of the practicalities of production techniques, wouldn't be on the line and flowing to their full capabilities three hundred sixty-five days out of the year? A Yes.

Q And, therefore, they would not be making their allowable. Is that correct? A Right.

Q How about the unlimited wells under the operation of proration, would they have been producing gas to their full capabilities also?

A No, but they have the opportunity and the availability to make up their under production where your smaller wells would not have that opportunity.

Q So that actually the point was that not, not that--well, I don't know what the point was exactly. I think it is correct to say that under any of the formulas the wells in the unlimited categories would, over a years period of time and assuming that pro--ration had cut down on what they would have otherwise produced, be producing less than they would have otherwise produced and were capable of producing?

A Probably, but not necessarily.

Q Mr. Weiderkehr, which do you feel is the more important in balancing out, which of these suggested formulas out to be adopted.. The consideration of the fairness of the formula and the impact on the people affected, or the quantity of clerical work necessary to be performed by the Commission and its staff?

A I think we are after fairness with respect to allowing each operator to recover his fair share of the reserves under his tract.

Q Of course, it there were some formula which would produce an unreasonable amount of clerical work in relation to the others,

you might cast about a bit to try to find one that wouldn't impose quite so heavy a burden, is that right?

A No, that is the Commissions job, not mine.

Q But you do not feel that there is any overwhelming variance in the amount of clerical work that would be required in the administration of either the 75-25, or 50-50 or 25-75 formulas?

A Not overwhelming, no.

Q Talking about your maximum allowable factor, you stated, I believe, that it was approximately three times the average of the wells in the pool, is that right?

A Three times the average that I assume would be the average allowable, yes.

Q There would then be considerably more than a three to one spread, would there not, between the best and the poorest well in the field?

A Oh, definitely.

Q Have you investigated to see what that relationship might be?

A I believe testimony has shown that the deliverability, the minimum deliverability was something like thirty-six MCF per day. I know there are some very small wells. It could range from, as I said a while ago, from one MCF or zero to two and a half.

Q It would produce a range of perhaps forty-six point forty-one?

A It could, yes.

MR. GRENIER: That is all

MR. SPURRIER: Anyone else have a question Of Mr. Weiderkehr? The witness may be excused and we will recess to one-fifteen.

(Witness excused.)

Afternoon Session

Thursday, June 24, 1954, 1:30 P. M.

MR. SPURRIER: The meeting will come to order, please. Mr. Gordon.

MR. GORDON: I would like to make two statements with your permission, as I have to leave sometime this afternoon.

MR. SPURRIER: How long will that be?

MR. GORDON: About a minute.

MR. SPURRIER: Let's here them.

MR. GORDON: I am Joseph Gordon representing Three States Natural Gas Company. Three States does not operate in the Blanco-Company field, but we do have over-riding royalty interests of eighty-four and a half percent in more than fifty-four Mesaverde wells. Also over-riding royalty interests amounting to five to twenty percent in six additional Mesaverde wells and will possibly have additional interests under fifty more wells, if the total acreage is developed. At the present time we receive a total revenue from the sale of five hundred million cubic feet of gas net per month.

We are vitally interested in any proration formula which is set up for the field. Three States recommends the allocation formula as set up by and recommended by El Paso Natural, which is seventy-five percent deliverability times acreage and twenty-five percent on acreage. We believe that will be fairest for an equitable, workable formula which will protect the rights and give protection to all producer.

The Albuquerque Associated Oil Company has requested me to

advise the Commission that they concur in this recommendation.

MR. SPURRIER: Mr. Jones.

MR. REES-JONES: May Mr. R. G. Carlin be sworn.

R. G. CARLIN

having been first duly sworn, testified as follows:

By MR. REES-JONES:

Q Would you state your full name to the Commission?

A R. G. Carlin.

Q Where do you live, Mr. Carlin?

A Dallas, Texas.

Q By whom are you employed?

A Delhi Oil Corporation.

Q In what capacity?

A Assistant to the Vice-president in charge of drilling and production.

Q You hold an engineering degree and have testified before this Commission on a number of occasions in the past?

A I do, and I have.

Q You have had approximately five years experience, four to five years experience in the operation of wells in the Blanco-Mesaverde Pool?

A That is right.

MR. REES-JONES: If the qualifications are agreeable, I will continue.

MR. SPURRIER: They are.

Q Mr. Carlin, how many wells approximately does Delhi Oil Corporation own or operate in the Blanco-Mesaverde Pool?

A At the present time Delhi Oil operates approximately fourty-

eight wells.

Q How many-- A Delhi?--

Q Go on.

A Delhi has a substantial working interest in approximately fifteen additional wells.

Q Delhi Oil Corporation owns and operates lease S in the four township area, that is, Township 30 and 29 North Range 8 and 9 West, is that correct?

A That, among others.

Q It is that acreage which is committed to Southern Union Gas the Gathering Company?

A That is correct.

Q Delhi Oil Corporation also owns and owns a substantial over-riding royalty on approximately one hundred thousand acres situated elsewhere in the Blanco-Mesaverde Pool?

A Yes.

Q The leases on which the over-riding royalty are owned by El Paso Natural Gas Company?

A That is right.

Q Have you had occasion to participate in the San Juan Basin Operators Committee, Engineer Sub-committee hearings which have been held?

A I have.

Q You have participated in those hearing pertaining to the proper allocation formula for the proration of gas in the Blanco-Mesaverde Pool?

A Right.

Q In the interest of brevity and to expedite the hearing, have

you prepared a statement which expresses your opinion and the opinion of Delhi Oil Corporation pretaining to a proper proration formula which you will recommend that the Oil Conservation Commission institute in the Blanco-Mesaverde Pool?

A I have. And with the Commission's approval I would like to read this in order to save time and eliminate perhaps some repetition which we have already seen during these last several days.

The thoughts and considerations developed at the numerous meetings held by the operators over the past several years have indicated a general lack of good reservoir data in the Blanco-Mesaverde reservoir. Many attempts have been made to secure such data as porosity, permeability, thickness of pay zone or zones, pressures and deliverabilities. Core data in the Basin has been very meager and attempts to correlate the availabe core data have resulted in conflicting information.

We have seen in core analysis made available to us that the permeabilities are very low, porosity ranges between two point six and seventeen point three percent, and continuous gas bearing sad sections are difficult to trace from one well to another. The sandstone and sand differential beds in all three parts of the Mesaverde group are commonly gas bearing but in various quantities from well to well and from land to lan with numerous cases of considerable variation in productivity showing up not only in areas, but in offset wells.

The reliability of the pressure data accumulated during the first several years of the life of the field leaves much to be desired as it has been only recently that uniform pressure tests have been made. In my experience, this is the only gas field with which I have had either any direct or indirect connection on which

some type of back pressue test could not be run with confidence that a true test was being obtained. Until the existing order regarding deliverability was adopted in the past year, there was no standard uniform method of testing wells as between operators and leases except by the use of the open flow P. T. tube determination. It has been brought out in previous meetings that the Mesaverde formation is divided into three questionable traceable members, and work we have done trying to correlate and properly interpret gamma ray and neutron logs has borne this out. We believe the Point Lookout Formation to be the primary productive sand in most areas, and is the sole sand open to production in over one hundred wells in the field. Another part of the field only the Cliffhouse sand is open to production and I believe that Delhi Oil Corporation has had more experience than any other operator in this field as regards recompleteing wells from initial Cliffhouse completions to include completing opening of the entire Mesaverde section.

Inasmuch as we were one of the first operators in the Basin we learned from experience that we could increase our well productivity considerably by opening up more sand sections in the well bore. Our average increase in deliverability in these cases was approximately four times the initial deliverability. This increase is not due to increasing the percentage of stimulation, as our records indicate on these recompletions that the wells were shot with fewer quarts of nitroglycerin per foot than had been used in the original Cliffhouse completion.

Therefore, it is my opinion that this increase must be due primarily to an increased productive sand count. This example is used merely to illustrate that with an increase in gas bearing sand

section, we note a corresponding increase in deliverability in the Mesaverde formation. This condition may be further illustrated by comparing on a field-wide average basis isopotential and isopachus maps. Isopotential maps are consistent in that all operators have used the same testing procedure and considerable difference has been experienced in attempting to properly pick net sand from available gamma ray and neutron logs. However, by using a reasonable count of clean-porous sand and being consistent on all wells, an isopachus map may be constructed that will compare favorably when superimposed on an isopotential map.

Our work at this time in our Geological Department is prelimirary, but sufficient work has been done to indicate we may expect a straight-line average relationship between average isopotential and isopachus well conditions which compares favorably with the Exhibit Two which I believe El Paso Natural Gas Company has presented as an exhibit to the Commission.

It is necessary, as stated before, that any reserve studies or reservoir analysis be developed considering average conditions in order to eliminate any inequities resulting from localized and unusual conditions. It has been the practice of Delhi Oil Corporation to retain and use consulting engineers and geologists to prepare reserve studies for use and to illustrate the wide spread of calculated recoverable gross reserves in one area.

I would like to call your attention to Township 30 North, Range Nine west, which township is in a structurally favorable position for Mesaverde production. We have completed approximately twenty-five wells in this township and the reserves have been calculated at a maximum of sixty-three million feet per acre in the section,

one to four million seven hundred thousand feet per acreage, in section sixteen, and I am speaking of recoverable gross reserves.

We have heard various testimony during the past several days on the continunity, as I would term it, of production. I can recollect that we made a study for the month of October 1953 in which all of Delhi's Mesaverde produced an average of seventy-five percent of the month. That particular month is not during the summer and is not during the winter. I believe, that it could realistically show that such a figure may be uniform or consistent at the present time. I am sure that almost everyone here is familiar with the changes in drilling and completion techniques in the Basin over the past few years. These conditions have been instrumental in numerous cases in affecting the initial potential of a well. In my opinion, we are due to see more changes in drilling and completion practices in the future that will materially affect the economics of gas production in the San Juan Basin. Two major changes to be realistically considered are,

One, decreased drilling and completion costs, and two, increased deliverabilities of average wells.

In making these statements, I have attempted to show that due to the lack of sound reservoir data and changes in completion techniques, we are forced to accept the conditions as they exist. There are only two factors which are available that may be used in the calculation of a proper allocation formula and these are: One, well deliverability, and, two, acreage.

Q In conclusion, Mr. Carlin, would you express to the Commission your opinion of the properproration formula to be instuitued in the Blanco-Mesaverde Pool?

A In considering proration, it is necessary that a formula be adopted that will enable each well to currently produce its allowable and ultimately produce profitably approximately the amount of recoverable gas underlying the drilling unit upon which it is located. Ownership of surface oil and gas rights and productive gas wells properly located to secure over-all field averages of reserves and deliverabilities is essential to maximum utility and profit.

It is my opinion that the many factors which should be considered in connection with proration formula are elementary and basic. Such factors as pressures, open flow, porosity, and thickness of pay are all taken into consideration and given proper weight on the deliverability of a well to put gas in the pipeline against pipeline pressures is taken into account.

Considering this acreage factor field rules have designated a drilling unit in the Blanco-Mesaverde Pool as comprising three hundred twenty acres. It is our opinion that one well completed in the Mesaverde formation should adequately and sufficiently drain three hundred and, considering the cost of drilling, equipping and operating one well in comparison with the estimated recovery per acre and the relatively slow rate at which production from the field can be ratably and non-wastefully marketed, the basic unit, acreage unit to be considered in a proration formula should be three thousand twenty acres. In no instances should three hundred twenty acres be attributable to a well for the purpose of calculating the acreage factor except upon specific order of the Oil Conservation Commission.

However, it has been suggested, and I am recommending that

in the Blanco-Mesaverde Pool a three hundred and twenty acre proration unit should include for all practical purposes units having acreage between three hundred fifteen and three hundred twenty-five acres, inclusive. It is Delhi Oil Corporation recommendation that a proration formula for the Blanco-Mesaverde Pool be composed as follows:

That well allowable is equal to well deliverability divided by total deliverability times well acreage divided by three hundred twenty times market demand, or in other words, one hundred percent deliverability times acreage.

MR. REES-JONES: I will pass the witness.

MR. SPURRIER: Anyone have a question of Mr. Carlin?

MR. UTZ: I would like to clarify the reserve figure he gave. What was your span and the location of the reserve figure?

A I have compared section one with sixty-three million feet per acre which is in 30-9, as against four million seven hundred thousand in section sixteen. I have taken those extremes in one township because that has seemed to be the township, which we have discussed more often here than any other township. Those reserves are as calcualted by a consulting engineer for Delhi's management use. If it is the desire of the staff of the Commission, I would allow the two volumes of this particular reserve estimate to be, you may see the reports, but as far as that is concerned, from there on out it is a mangement report and I would prefer that it go no further.

MR. UTZ: I would be happy to look at it.

MR. SPURRIER: Anyone else?

MR. WEIDERKEHR: Weiderkehr, for Southern Union.

By MR. WEIDERKEHR:

Q You stated, I believe, that the primary source of gas insofar as your opinion, that this gas was coming from the Point Lookout Zone?

A I said in some cases.

Q Are you familiar with Turner State Well located up in Section 2-39?

A Very little.

Q Were you here the other day when testimony was presented with regards to that well?

A If it was presented I was here.

Q Do you recall as to where that well was completed, bottomed?

A No, I don't.

Q You don't know that it was bottomed above the Point Lookout Zone, according to the testimony that was presented?

A If that is the testimony and it is in the testimony I will accept it.

Q That being the case, how do you account for the fact that it is extremely large although the Point Lookout, which you contend is the major source of gas supply, why does that well have such a high deliverable capacity?

A That is in the Point Lookout.

Q It did not drill to the Point Lookout according to the testimony.

A I will say again that the factors are basic and deliverability is composed of three primary factors, thickness of pay, porosity, and pressure and with any one of the three basic elements missing we do not have a well. Therefore, my explanation is that we have a favorable group of the three basic factors in this particular well.

Q Mr. Carlin, didn't you misstate as to what deliverability consisted of just a minute ago? Don't you think one of the primary factors in deliverability is permability?

A That is one of the factors.

Q Don't you think it is a prime factor?

A It is one. It is not the prime factor.

Q It is not the prime factor? What is the prime factor?

A I think it is the combination of the feet.

Q Of millidarcy feet, primarily. As an engineer--

A We are speaking of the ability of a well to produce.

Q Right.

A Whether or not a well is able to deliver. A well is not able to deliver if it does not have a combination of the three, and I will include permeability, four basic elements.

Q All right now. You mentioned, you made some mention of recoverable reserves that varied from, I believe, sixty-four million feet per acre to four million feet per acre? Were those recoverable reserves or were those reserves in place?

A Those were recoverable reserves.

Q You also mentioned, I believe, that it was Delhi's recommendation that a proration, that you thought a well could drain three hundred twenty acres?

A Yes, sir.

Q Do you think it can drain three hundred twenty-one acres?

A I said that a proration unit should be composed of acres between three hundred fifteen and three hundred twenty-five, therefore, I would say that it probably could drain three hundred twenty-one acres.

Q Then there could be drainage between leases?

A I am not sure. I have no knowledge that at the present time there is. Five or ten years in the future I may change my mind.

Q That isn't what I asked you. If you say a well should be allowed from three hundred fifteen to three hundred twenty-five acres, you are assuming that it could drain the two hundred twenty-five acres and you wouldn't want to give an allowable of three hundred twenty-five acres to it?

A I recommended that the particular ten acre spread be adopted as a management convenience for the Commission.

Q Do you think that a well could drain three hundred twenty acres but it would drain three hundred twenty-one?

A I have no knowledge to the contrary.

Q You made a statement that your company had done some work to show that there was a straight line relationship between average deliverability and reserve, is that what you said?

A I am comparing an isopachus map and an isopotential map and average conditions.

Q Didn't you mention a straight line relationship?

A Yes, sir.

Q In that correlation, did you find numerous points that didn't match that straight line relationship?

A As I said, our work at the present time was preliminary and we do believe that there is a straight line relationship. At the present time we are finding some points which are not in the straight line, I will admit that, but I said that we are prelimirary in our work but I believe that at some time in the future we can

present such information that will substantiate it.

Q The deliverability then is entirely a straight relationship with reserves?

A That is our contention.

MR. WEIDERKEHR: Thank you.

MR. SPURRIER: Anyone else?

MR. FOSTER: What is that straight line, what is the slope?

A That is some place between fifty and sixty degres.

MR. SPURRIER: The witness may be excused.

(Witness excused.)

MR. KITTS: I would like to have Mr. Utz and Mr. Arnold both sworn.

E. C. ARNOLD,

having been first duly sworn, testified as follows:

Direct Examination

By MR. KITTS:

Q State your name, please?

A E. C. Arnold.

Q You are employed by the Oil Conservation Commission as a geologist?

A That is correct.

Q Where is your place of employment, Mr. Arnold?

A District Three office in Aztec, New Mexico.

Q Have you testified previosuly before this Commission as a geologist?

A Yes, I have.

MR. KITTS: Mr. Chairman, are the witness's qualifications acceptable to the Commission?

MR. SPURRIER: They are.

Q Have you made a study regarding the geology and gas production of the Blanco-Mesaverde Pool?

A Yes, I have.

Q I believe you have prepared what is marked Commission's Exhibit Number One, a geological cross-section of the Blanco-Mesaverde Pool. This was prepared by you or under your direction and supervision?

A Yes, it was.

Q Would you go to Exhibit One and explain it, that is, the scale and data and what it is designed to show.

A Exhibit One is a Northwest, Southeast cross-section across the Blanco-Mesaverde Pool. It is shown on this map by the dash line CC Prime. The general purpose of this cross-section is to show the general geological character of the Mesaverde formation across the Pool. Also, to show that it is composed of three fairly distinct members, two sandstone bodies, the Cliffhouse Sandstone at the top, Point Lookout sandstone at the bottom separated by the Menefee formation which is a shale, coal, sandstone stringer. I believe the word they used was heterogeneous formation separating the two. I believe that this cross-section shows that the Blanco-Mesaverde Pool is one reservoir and that the main members in the Mesaverde Group can be traced across the entire Basin.

Q How long a line, or what distance does that, does Exhibit One show, is it about fifty miles?

A Yes, horizontal scale is one inch to one mile and the section is approximately fifty-four miles long.

Q What data do you have available to use in the preparation of this exhibit?

A Preparation of this exhibit, I used gamma ray and induction and gamma ray neut on logs exclusively, which was the only well information we had which you can use across the entire Mesaverde.

Q You have shown, made a determination or estimation of net pay, would you care to say how you arrived at that?

A Yes, the method used here is essentially the method which has been used by the Oil Conservation Commission in all reserve determinations in the past. Essentially what it is, we determine where the sand stone is by gamma ray decrease on the left side of the log. You will notice that opposite each gamma ray decrease you have an induction or neutron count increase. We have deducted from this total sand thickness various sections of that sand with the induction or neutron log which in my opinion were probably shale stringers or shalely sand, at least two types produced.

Q You have on that exhibit certain dark bqrs or black bars, those indicate--

A Those indicate--

Q Go ahead.

A The total effective net pay as taken from each sandstone member.

Q Would you read off some of these figures, at least the maximum figures you show there?

A The extreme west and forty-five feet in the Cliffhouse, fifty feet in Point Lookout, a total of ninty-five. The highest value shown in this cross-section is in Section Five, 29 North, 7 West, El Paso Natural Gas Number one, Hodges, they have sixty-five feet in Cliffhouse, seventy feet in Point Lookout, total of one hundred thirty-five feet. The smallest value is shown in Section 18, 28, 4,

El Paso Natural Gas Number One Valdez, twenty feet in Cliffhouse, ten feet in Point Lookout, a total of thirty feet.

Q So the maximum ratio in this particular cross-section would be about four and a half to one, would it not?

A That is about correct.

Q About correct. I note that you show no estimated net pay in the Menefee member. You feel that there is no gas being produced from that member?

A No, we feel that there is a possibility that some gas is being produced by the Menefee formation, however, we feel that it is also almost impossible to evaulate this part of the reservoir due to the fact that we felt we should use a conservative approach in net pay determination; we have ignored it altogether. Although there are sands shown in the Menefee, as a rule the log indicates that they are not as good sand as in the Point Lookout and Cliffhouse, due to the fact that cores have been taken in the Cliffhouse and Point Lookout which indicate very small permeability. We hesitate to use Menefee Sand without something upon which to substantiate that position.

Q Leaving Exhibit One for the moment, Mr. Arnold, I believe that you have also prepared Exhibit Two. Would you state what that exhibit is?

A Yes, this is an isopachus map of the Blanco-Mesaverde contoured on equal net pay thickness.

Q The countour interval is what?

A Twenty feet.

Q What dat did you use in the preparation of this exhibit?

A Also used gamma ray induction log across the field, of which I have examined I would estimiate seventy-five percent of the log

in the field, however the actual value is, as contoured on this map, represent only about one hundred fifty wells.

Q For those one hundred fifty wells you actually have the net pay marked on that exhibit?

A That is correct.

Q As well as the contour lines. Are the wells shown on Exhibit One likewise shown on Exhibit Two and would you point that out to the Commission. Is that your CC Prime line?

A Yes, this is the CC Prime line, almost completely across the Pool as delineated.

Q What was the maximum--what was the maximum and minimum net pay thickness that this exhibit discloses?

A The maximum net pay that is found on the exhibit was one hundred forty-five feet, the minimum outside the last contour is thirty feet, therefore, the ratio as across the complete Pool as shown by this exhibit is five to one, approximately.

Q Is there--approximately, that is not exact. Is there any apparent trend in the variance of net pay thickness from one area to another in the Pool?

A The next variation which I have--

Q I mean in the trend and thicknesses from one are to the other?

A Yes, you will notice that in general the areas of thickest net pay are in the central portion of the Basin and does thin toward the edges.

Q Mr. Arnold, what is the maximum variance or ratio that exhibit shows as to net pay thickness between offset wells or in between wells one to two miles distance?

A Maximum variation I found is between the well in the Southwest quarter of Section 33, 30 North, 9 West, and in--pardon me, that is in Section 35, 30 North, 9 West, and Section 1 of 29 North, 9 West.

Q What is the approximate distance and what is the--

A The approximate distance is a mile and one half, the variation is a hundred forty-five feet to eighty feet.

Q About 7-4.

A Which is approximately seven to four.

Q It would also appear, would it not, from that exhibit that about ninety percent of the Blanco-Mesaverde Pools shows a net pay thickness of fity feet and over. Would you point out that fifty foot contour line?

A This is this contour. I would say that is correct. Using that line the ratio would be fifty feet to one hundred and forty-five feet or approximately three to one.

Q You have indicated that your figures as to net pay thickness are conservative and it would appear from the other testimoney that your figures are compartively conservative, is that correct?

A I believe they are, yes.

Q Do you believe, however, that even though some other geologist with your same data might have arrived at different actual figures for net pay thickness, he would still have arrived at similar figures as to ratio?

A Yes, I believe the previous testimony in some cases had substantiated that, that the ratio, whether you use net pay from each sand or whether you use the full section will be approximately--

Q The ratio?

A Within the same limit.

Q Mr. Arnold, have you made a study of porosity in this area and if you have will you state what data was available to you, and what your results showed?

A I made a study of five cores, generally in the central part of the Pool. The porosity range, the average porosity range on those five cores was seven point one percent to thirteen point five percent or approximately two to one. The average porosity range.

Q You mean the average of the well with the lowest porosity and the well, average of the well with the highest porosity?

A That is what I mean. That was from the sections from which I determined my net pay figures.

Q Then it would be possible, would it not, in a hypothetical situation for it, for this extreme ratio of five to one in net pay thickness to be combined with the extreme ratio of two to one in porosity so as to result in one well having ten times the reserve of another well taking these two factors into consideration?

A That would be possible, but in my opinion it is not reasonable to assume that merely because a well has the thickest net pay, that it should also be assigned the highest porosity figure. At least not without evidence to substantiate that standard.

Q What you are saying, is it not, is that what we are trying to determine as nearly as possible is the probable reserves and reserve ratios of the various wells so as to arrive at a just proration formula. It would be unrealstic to assume the extreme porosity and the differences in reserves as the basis for such a formula, is that what you mean?

A I believe that is what I mean.

Q Mr. Arnold, have you also made a study of connate water

in the area and if so, what was your basis for your study?

A Yes, I made a study of connate water to the same five cores I mentioned a while ago. The range, the greatest average, the range from the lowest average to the highest average was approximately twenty to forty percent on those cores.

Q Was any trend shown by your study as to this variation from one area to another or did you indicate they were all pretty much from one area.

A No, on the basis of those cores, I don't believe that you could establish any trend so far as prosity or so far as connate water is concerned.

Q Is there anything further at this time that you wish to say about Exhibit One or Two?

A No, I don't believe so.

Q I believe you have also prepared two other exhibits which we have marked Four and Five about which Mr. Utz will testify more fully a bit later. Did you prepare these two exhibits, Four and Five?

A Yes, I did.

Q Will you state what they are, or what they represent?

A Yes, these are twho short corss sections across an area as shown on this plat AA Prime is A North, is a South to North section as indicated here, BB Prime is a West to East cross section as indicated here.

Q You are referring to these exhibits on the right hand side of the front of the hall here?

A That is correct.

Q Four is the one on top and five is the one on the bottom?

Yes.

MR. FOSTER: What is the purpose of that other exhibit?

MR. KITTS: That is Exhibit Six and was prepared by Mr. Utz and will be testified to by him. That is Exhibit Number Three. We offer in evidence Exhibits One, Two, Four, and Five.

MR. SPURRIER: Is there objection?

MR. SMITH: I would like to object to their admission on the ground that the statute provides for the determination of an allocation formula on the basis of recoverable reserves. There has been no evidence in support of the exhibits which indicate they establish anything but the reserves in place. They have no probative force and should not be admitted.

MR. KITTS: Mr. Smith, will you please restate that.

(Mr. Smith's statement read by the reporter.)

MR. YOST: That certainly shows if the Commission, please, reservoir conditions. I think the Commission in interested in that point. Mr. Smith's statement certainly, reserves in place certainly has some connection with recoverable reserves.

MR. SMITH: I think it is valid that the admissability as to time has not been established. Subsequent testimony might tie it together. As of the present position, they are not admissable.

MR. MACEY: I think Mr. Smith that your motion is presently well taken to some extent, but you have got to remember that the purpose of this exhibit is to show the presence of the Blanco-Mesaverde Pool as defined by this Commission, that is one of its statutory duties. Mr. Arnold has outlined the Pool on the map. He has shown the wells which occupy their position in that Pool. I can't see any relationship between these exhibits as they differ from any of the

previous exhibits that have been offered in evidence. If it applies to these exhibits it might likewise apply to all the other exhibits that have been introduced.

MR. SPURRIER: Objectio overruled. The exhibits will be admitted.

MR. KITTS: That is all for this witness.

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

Cross Examination

By MR. SMITH:

Q Mr. Arnold, referring to, referring to Exhibit One, I believe that you showed certain lines marking the upper and lower limits of it, what portion of the reservoir is this up here, Point Lookout?

A No, that is the Cliffhouse.

Q In depicting your lines in here--

A I would like to explain that those do not necessarly connect the same geological horizon on each cross-section. Those are merely lines across the section showing that part of the sandstone from which I--

Q (Interrupting) In making your selection of the marker, how did you go about it?

A Well, that I suppose would be a matter of interpretation. It was my opinion that those markers connected the upper and lower portion of that member.

Q How do you arrive at the location of the geological marker in each of these wells?

A Well, I used the value from the gamma ray induction log.

Q What was that value?

A That was approximately sixty percent on the gamma ray side

and the value on the induction curve varied, I would say, between the limits of thirty and forty.

Q Why did you select those particular figures?

A Because from studying all the logs in the field, comparing one against the other, I arrived at the conclusion that those lines separated those standsone members from the shale members in the Mesaverde Group.

Q How did you come to that conclusion, just select an average figure or did you have some other factor in consideration?

A No, I suppose you, if there was arriving at that conclusion it was from conversation with other engineers, other geologists working in the field. Also, I think that I could say that to some extent at least, it was from the core data. Also, I think I could say that it is generally accepted that the shale line on the gamma ray log is to the right and that the sandstone line is to the left. I mean it is the only tool I had with me. I don't say it isn't slightly arbitrary, but I don't feel at all exclusive in that respect.

Q That, to a certain extent, is your selection of the marker. It is arbitrary?

A To a certain extent.

Q To a certain extent your selection of the marker is arbitrary?

A To a certain extent.

Q In reading these various graphs, I don't know a thing about them here, I know these swiggles in here are a little more pronounced, does that indicate that is the particular area that should be selected?

A That is exactly correct.

Q Let's look, for instance, then at this particular well here which is the El Paso Natural Gas Company State Number One and

observe that you have shown the top of the marker of the lower zone, which zone is that?

A Point Lookout.

Q Has been selected at a given point shown on the exhibit and we have swiggles which apparently in the Menefee are virtually identical?

A No, I don't believe they are virtually identical.

MR. SPURRIER: Where did you pick up that information?

MR. SMITH: I am just looking at the exhibit.

MR. SPURRIER: I wonder if you qualify as a geological expert?

MR. SMITH: No, I am trying to get the information from the geologist.

A I believe that you will find by examining the log that you do have a larger gamma ray decrease in this section than you do in any section of the Menefee.

Q The fact that it is larger does not mean that you should exclude the Menefee from consideration, does it?

A I believe under direct testimony, that I said we did not exclude the Menefee from consideration as a possible source of gas.

Q But in compu ting your differentials there you excluded it?

A That is correct.

Q Don't you think that it would be better to have taken some factor to have established possible the productivity of the Menefee?

A I don't believe that anyone else has attempted that. Also, I don't believe that if you did do it, I think it would be more or less of a relative matter. If you increased the reserves under one tract you wouldn't increase the reserve under the other tract. The overall ratio would remain fairly constant, I believe.

Q As far as an individual well is concerned it could possibly have greater deliverability and greater reserves as a result of having more gas in the Menefee than is present in some other well?

A I would say that it is probable.

Q You would say that it is probable?

A On the basis of so few facts, I would not want to venture an opinion. I mean so few facts that has been made available by anyone in the hearing so far regarding the Menefee.

Q With respect to the analysis of connate water which you made, I don't believe you testified on direct examination as to what differential existed between the high and the low? What is that differential?

A Between the high and the low?

A Yes.

A I believe I stated twenty to forty.

Q What is that differenial, two to one?

A Approximately eight to six.

Q I would just like to know, would that not be a contributing factor to the existence or non-existence of gas. It certainly would. I merely say that you can't establish trends whereby you can pick one value up in one area and move it to another area without reason.

Q Then so far as the differential which you testified to is concerned, is based entirely on your estimate from the logs up here and the location of the geological marker as to the sand thickness, and that alone?

A The sand thickness, that is correct.

MR. SMITH: That is all.

MR. SPURRIER: Anyone else?

MR. GORHAM: I just have one question in regard to the log or the cross section which has been discussed.

By MR. GORHAM:

Q Mr. Arnold, in computing effective net sand pay, you have used, you have used, as you pointed out, the method which most of us have used of using a particular point of deviation from the shale line to the sand line as that particular point whereby you would either give it net effective pay or no net effective pay, is that correct?

A That is correct, I believe.

Q Are you aware of the fact that in the area under discussion that gamma ray neutron logs have been taken with different sensitivity?

A Yes, I am aware of that fact.

Q Since they have been taken with different sensitivity, could a you not assume that in a particular well where it is required to use a sensitivitiness to keep the so-called sand on the paper, that the correlative shales could very well have a particular percentage of higher than the so-called sand on another well with a lower sensitivity?

A That is right. I think that it is more or less a relative matter not only as between wells but in some cases as between different parts of the Mesaverde section on individual logs. Therefore, I don't think that you can establish a point on a gamma ray log and not vary from it at all. In all the same way, I don't think you can establish an exact point on an induction log and not vary from it. To that extent the study has to be arbitrary whether you are trying to pick net pay, gross pay, sand count or--

Q I see, so therefore, then from o e well to another although you have been arbitrary, using a sixty percent ration from one well

to another it is quite possible that that ratio could be much greater or much less, actually?

A Which ratio?

Q As the sixty percent line which you used.

A It could vary from the sixty percent line someway, yes.

Q Getting back to the point just momentarily of the Menefee formation, you testified that in view of the fact that though credence was given to the Menefee on direct testimony, or testimony before the Commission, you have chosen not to give the Menefee any particular reserve in your study?

A Yes, We felt that we had the responsibility to use a conservative approach in the determination of reserves, therefore, we, due to the fact--I think you will agree--the Menefee would be very difficult to evaluate as a reservoir for the purpose of--

Q The point I am trying to get at is that, I think you will agree or I will ask the question, do you agree that the Menefee zone which primiarly consists of shale, sands, and coal in a heterogeneous condition, do you believe that the Menefee zone in any particular area has a much greater or higher ratio of sand as compared to other areas?

A Within the limit of the Blanco-Mesaverde Field, I have never found, I don't say it doesn't exist but I have never, perhaps I should say, I haven't made a detailed enough study of the problem to determine that. It is very difficult to do.

Q Are you aware of the fact that in, in 30 North, 9 area that the so-called possible development of sand as reduced in the gamma ray log in the Menefee zone is considerably higher if not terrifically higher than around the fringe of the Basin?

A Around the fringe of the Pool. I think that might be possible.

Q Assuming that is possible, and assuming that those sands could contain gas, it is conceivable that the Menefee should be given some credence as gas reserves in a particular area as compared to any other area, is that correct?

A As compared to other areas?

Q That do not have that sand content?

A I would not want to venture an opinion on that without making further study.

MR. GOHARM: That is all.

MR. GRENIER: Grenier, with Southern Union.

By MR. GRENIER:

Q Mr. Arnold, in making a study of this kind, you feel that you are being arbitrary, when from examination of a seris of factors you arrive at a conclusion based upon your best judgment?

A I didn't understand the question.

Q We will lay a little more predicate for the question. I believe you said in response to a previous question, that picking these points as the top and bottom respectively of the Cliffhouse and Point Lookout sandstone, that you had been arbitrary in your selection of those top and bottom markers--

A (Interrupting) I said--

Q (Continuing) What I am trying to get at is was it without any reasonable basis, in fact, as we commonly understand the word arbitrary, or was it based upon your professional judgement in the light of all you knew about this situation?

MR. KITTS: Objecton.

A I don't object to the question. I would just as soon clarify.

MR. KITTS: You don't object to it? All right clarify it.

A I think the very nature of gamma ray induction logs makes them difficult to correlate one well to another well, therefore, it is very often hard to pick the exact spot on one log that you pick on the next log for the purposes of correlation, however, I don't believe that anybody would say that these zones are not easily identifiable.

Q But you didn't arrive at the tops and bottoms in any mechanical fashion, you looked at each one and examined it and using your best judgment said to yourself, "This is probably the top, and this is probably the bottom based on my professional knowledge and experiences."

A That is a fair statement.

Q Is that a fair statement of your mental processes that you went through?

A That is a fair statement;

Q Do you know of any well which proves by production exculsively from the Menefee that there is or is not Menefee production.

A No, I do not.

MR. SPURRIER: Anyone else?

MR. BARNES: Mr. Barnes, for King-Loc Petroleum Company and Candado Production Company.

By MR. BARNES:

Q Mr. Arnold, why did they run those gamma ray inductions logs on all those wells, what was the reason for it?

A It was due to the fact thqt there was developed completion methods which utilized gas as a drilling fluid and you cannot run an electric survey in a well unless you have mud in the hole as a drilling fluid.

Q In other words, all the wells on your corss-section were drilled in with gas, is that correct?

A That is correct.

Q When you drill a well in, or complete it with gas, you don't recover any cuttings or samples, do you?

A Well, you recover cuttings, but they are usually so well mixed that it is practically impossible to separate sand from shale or anything else.

Q In other words, they are just blown out with the circulating gas and they are of no value to the geologist in determining the physical character of the reservoir beyond the assumption he can make from that log, is that correct?

A That is correct.

Q Do you believe that if any engineer or a geologist was trying to evaulate the gas reserves and the reserves character in the San Juan Basin and he had never had any experience in running or examining cuttings under the microscope, and had never examined the Mesaverde formation in the field or traced the various beds around the edges of the Basin, that he would have a rather warped opinion if he had nothing to work with but those gamma ray induction logs?

A Yes, I think that is very true. I think he would tend to call some things sandstone which are very likely not sandstone, from a gamma ray induction.

Q Have you had an opportunity to run cuttings from various wells in the Blanco-Mesaverde Pool over a wide area of the Basin?

A Yes, in the past I have.

Q Have you had ample opportunity and have you taken the time to examine the Mesaverde formation in the out-crop, made any out-crop

studies of it?

A I have also done that.

Q In other words, you evaluation of the reservoir thne has been temperted to some extent by observation other than with the gamma neutron logs, is that correct? A That is correct.

MR. BARNS: That is all.

MR. SPURRIER: Anyone else? Witness may be excused.

(Witness Excused.)

MR. SPURRIER: We will take a short recess.

(Recess)

MR. SPURRIER: Let the record show that the time for the statements to be heard is July ten.

ELVIS A. UTZ,

having been first duly sworn, testified as follows:

By MR. KITTS: Direct Examination

Q State your name, please.

A Elvis A. Utz.

Q You are employed by the Oil Conservation Commission as a gas engineer ?

A Yes, I am.

Q Have you testified previously before this Commission as a gas engineer?

A Yes, I have.

MR. KITTS: Are the witness's qualifications acceptable to the Commission?

MR. SPURRIER: They are.

Q Mr. Utz, among your duties as a gas engineer with the Commission is the estimate of recoverable reserves in the various

reservoirs, is that not among your duties?

A Yes, it is.

Q In considering, in estimating recoverable reserves, do you take into account andy consideration data such as is contained in Exhibits One, Two, Four, and Five?

A Yes, I do. To expand a little on the question, I have been computing reserves in the San Juan Basin, or estimating reserves for the Commission since late 1941 or 1949. Those estimates have been revised from time to time. In all of my reserves calcualtions the factor in so far as net pay is concerned has been used, or the values shown on this cross section and the values shown on exhibits, which is Exhibit One, is it, and Exhibits Two, Three and Four.

Q Those are Four and Five.

A The values shown on these exhibits. Is this Four and Five?

Q Four and Five.

A The values shown on Exhibits One, Four and Five are identical to the net pay used in my calculations which are recoverable reserves, in my opinion.

Q Mr. Utz, have you made a study of the deliverability and production in the Blanco-Mesaverde Field?

A Yes, I have.

Q I believe you have prepared, in connection with this study what has been marked as Commission's Exhibit Number Three. Would you go to that exhibit and explain the scale and the data on that exhibit?

A Yes, I will.

Q This graph is Exhibit Number Three. How many wells did

you study, first of all?

A Various curves indicate various numbers of wells. The most wells studied was five hundred six, depending on the deliverability, how the deliverability tests were run. This curve shows, I intend for this curve to show non-rateable take, not between companies, but between deliverable groups of wells or the ability of wells to produce and between pipelines.

The scale shown here is a percentage scale from five percent to a hundred percent. The vertical scale shown in the center is a MCF per day. You will note that it says "Average 1950 Production" but it is also applicable to average well deliverability. The numbers from A to V at the bottom of the graph indicate individual companies, the red curve is what I have chosen to call Deliverable Load Factors. This load factor is determined for the average well in each company, for the average well in each company the production is divided by the deliverability. Therefore, giving a percentage ratio for each company's average well. As may be seen here, the Company A has approximately forty-seven percent deliverability load factor, would be approximately thirty-six percent, and so on for Pipeline A.

Q What is the blue line, the blue curve?

A The blue curve shows what I have chosen to call a production load factor. Those production load factors and the curve as plotted for the purpose of showing the relationship between how the wells actually produced and what their capability of producing were. These production load factors were arrived at by using the monthly production figures as reported to the Commission by the companies. The maximum monthly production was assumed to be the ability of

the wells to produce. This was compared to what the well actually produced for the number of months it was on the line. That percentage ratio was shown by the blue curve.

Q What is your green line, Mr. Utz, and the red and blue circles in the vicinity of that green line?

A The blue circle is scaled on the center scale MCF per day and indicates the production or average well production for the number of wells for which each company had deliverability tests run. The red circle immediately above it, sometimes immediately above it, sometimes higher, indicates the average well deliverability for the number of wells on which deliverability tests were taken for that company. The relationship between the blue and red circles is shown by the red line. The green line simply shows the average well production for each company for all the wells that were producing in 1953.

Q Now the curves underneath Pipeline B on the same exhibit consist of the same type of information, do they not, the same factors?

A Yes, they do. The red curve again is what I have chosen to call the deliverable load factor: the blue curve is the production load factor: the red and blue circles and the green curve indicate, as I have described for Pipeline A.

Q Now, Mr. Utz, what is your interpretation of this exhibit, or this lefthand portion of this exhibit? Does it indicate a nonratable take or just what does it indicate to you?

A My interpretation of both Pipeline A and Pipeline B on the lefthand of this exhibit indicate to me no rhyme or reason to the method by which wells were produced in 1953, not only between companies,

but between pipelines. In other words, it means to me that the take was non-ratable.

Q Would you expect a different picture there as far as the curves are concerned under a proration formula, not any particular proration formula but under, let's say, proration?

A Under proration or ratable take these curves would not be regarded as they are now. It would be relatively straight if not straight. At least it would be a gradually curving slope.

Q Do you care to say anything more about the lefthand side of Exhibit Three?

A No, I believe that explains my analization.

Q Passing to the righthand side of Exhibit Three, will you give us the similar information as to that, the scale and what the curves mean there?

A The vertical scale shown for the black and green curves are again MCF and the same percentage scale as on this, as I related. In other words, the same scale is used clear across the graph. The bottom portion of this graph, however, is a study of the way these wells were produced in 1953 by deliverability groups. In other words, Group One is a group of wells within a deliverability range of zero to two hundred MCF per day. Group Fifteen is within a range of twenty-eight hundred to three thousand MCF per day. The production load factors, the deliverability load factors were computed for the average well within each range. The red curve shows the deliverability load factors for Pipeline A. This pipeline here. The blue curve shows the deliverability load factors for Pipeline B. As may be readily seen, again there is no apparent rhyme or reason to the way the production was taken from the various groups

of wells according to their ability to produce.

The curves are jagged but they do show a gradually declining trend as the wells get larger. In other words, the percentage of take from the larger wells was less. The black curve shows the average production for each well in each deliverability group and the MCF per day to the verticale scale. I don't--the green curve shows the average daily production for Pipeline A. I don't know whether I mentioned it or not, but the black curve is for Pipeline B. Again these curves could not show any relationship or any rhyme for reason within each deliverability group between pipeline. They run fairly close as the wells ability to produce increases up to about Group Eight or from fourteen to sixteen hundred MCF per day and from there on to the highest group or Group Twenty-three they get farther apart.

Q Do you have anything further you wish to state as to your interpertation of this exhibit, this portion of Exhibit Three?

A This simply means to me that by making a study between ability of the wells to produce instead of by between compaines, that their take was still unratable and non-ratable in 1953.

Q This was prepared by you, this exhibit?

A Yes, it was.

Q Would you state briefly again, generally what data you had available in the preparation of this exhibit.

A I had available to me for this study individual well production for all wells which produced in the Mesaverde formation in 1953. I had deliverability information on 1953 deliverability tests, which were taken from the first of April to along in December, for all wells on which those tests were taken.

Q Do you have any further comments you wish to make on Exhibit Three, Mr. Utz?

A I might bring out this point: That the average daily take from Pipeline A was two hundred eighty-three MCF per day to Pipeline B, five hundred sixty-two MCF per day, and the average daily take for both pipelines for the year, three hundred sixty-five days was 183,069 MCF per day. I believe that is sufficient.

Q You have also prepared, have you not, what has been marked as Commission's Exhibit Number Six, this exhibit in purple and orange?

A Yes, I have.

Q Would you state what that exhibit shows or portrays?

A First, I think possibly I should clarify that the lines shown on this exhibit are B to B Prime, indicate the cross-section shown in Exhibit Five, from west to east. The lines shown on Exhibit Six A-A Prime is the location of the cross-section shown in Exhibit Five B-B Prime from south to north.

Q So you show these seven wells in Exhibits Four and Five, is that correct?

A That is correct.

Q Is any other well shown?

A Yes, there are several of the wells shown.

Q Well, within the orange block or the red block?

A There is one other well shown which is not shown on Exhibits, Four and Five which I have chosen to call well "X". This well would fall if it were, if we had a log on the well it would have been in between the first and second well on Exhibit Four and in between the two center wells, or between the second and third wells

on Exhibit Five.

MR. SPURRIER: Mr. Utz, as a point of clarification, that north-south line on Exhibit Six should be identified as the line representing which cross-section?

A Exhibit Four on the A-A Prime cross-section.

Q Now there appears to be very little difference in net pay thickness in the wells shown in Exibits Four and Five, which are also shown on Exhibit Six, is that correct?

A There is very little variation across this local area an in net pays as picked by the Oil Conservation Commission geologist. The location, since this well falls in between the previous explained locations--

MR. FOSTER: Which well?

MR. UTZ: Well "X", I see no particular reason with a clear conscious to allow it any more net pay than it should be allowed as the cross-section above shows.

Q You mean an estimiated net pay for the purpose of this exhibit?

A That is right.

Q What net pay thickness did you give it for the purpose of this exhibit?

A The minimum net pay for this area as shown on Exhibit Five, is ninty-five net. The maximum net pay as shown on Exhibit Five, or Four or Five is one hundred twenty feet. However, we had net pay pick ups from wells in the general area, the maximum which was one hundred thirty feet. So in so far as allowing the pay for consideration of allowable on well "X" we were arbitrary in allowing it the maximum net pay for any well in the area.

Q That is one hundred thirty feet?

A That is correct. The red colored portion of Exhibit Six shows the dedicated area or the area dedicated by the operator as the area to well "X". Presumably, the acreage which well "X" will drain. The blue area is also the dedicated acreage for seven off-set wells.

From the information shown in Exhibit Four and Five, as well as from core information shown on Exhibit Nine, which is from a well in Section 19 South, we had better say the Southeast of Section 19, 30 North, 9 West, and core information on Exhibit Six from another well located in the Northeast quarter of Section 29, 31, and 9, and from other pertinent information, reserves were computed. In other words, reserves were computed for well "X" and reserves were computed for the average off-set drilling tract of three hundred twenty acres.

Q I believe in this connection, you have also prepared another exhibit, Exhibit Seven, have you not?

A Before we go on to Exhibit Seven, I have another word I would like to say about Exhibit Six.

Q Proceed.

A The reserves computed for well "X" for the three hundred twenty acre tract was seven thousand nine hundred fifteen million; or twenty-four and three tenths million per acre. The reserves computed for the average of the seven off-set tracts was six thousand eight hundred ninety-one million for each 320 tract or twenty-one and a half million cubic feet per acre. Referring now, to Exhibit Seven.

Q Which was I believe prepared by you, Mr. Utz.

A Yes, it was.

Q And refers to the data contained in Exhibits Four, Five, and Six, is that correct?

A That is correct.

Q Proceed. Explain that exhibit, if you will.

A This exhibit shows the results of what I should have more correctly called a Production Projection as between well "X" and the average off-set well. This is a fifteen year projection and the basis of this projection was the average 1953 production for well "X" as compared to the average 1953 production for the average off-set wells to well "X".

Q Meaning those seven off-sets?

A That is correct. That production was nine hundred eight MCF average for the seven off-sets as compared to 4606 MCF per day for well "X".

This exhibit will show how this well would produce over fifteen years if it were allowed to produce in the same manner that it produced in 1953. The vertical scale on the leftside is percentage of reserves produced. The red curve shows how well "X" would have produced its reserves in percentage of recoverable reserves over the fifteen year period.

It may be seen the percentage of reserves produced increased rather rapidly leaving off somewhat in the later part of the fifteen years. At the end of fifteen years, I estimate that well "X" will have produced ninety-two per cent of its reserves, if produced in the same relationship as it was in 1953. The blue curve shows how the average off-set well could produce over fifteen years if it were produced in the same relationship that it produced in 1953.

You will note, that it is a rather gradual increase in percentage

of reserves produced. At the end of fifteen years, I estimiated that the well, the average off-set would have produced fifty-one point five percent of its 6 thousand 891 million. In other words, over the same period there is considerable variation in the amount of reserves the well could produce by using the 1953 production.

Over on the righthand side of Exhibit Seven I have shown here in the vertical scale, wellhead pressure in pounds per square inch guage. The graph shows how the wellhead pressure would have reduced over the period of fifteen years. As the red line on Exhibit Seven shows how well "X" wellhead pressure would decline over the period of years. In other words, as may be seen, the decline is rather fast at first; as the pressure goes down it flattens out somewhat. At the end of fifteen years I estimiate that the wellhead pressure will be one hundred seventy-seven pounds. The blue curve shows the wellhead pressure would decline for the average off-set well to wellheads.

Again this is a more gradual decline over the fifteen years to a wellhead pressure of five hundred sixty pounds at the end of fifteen years. The figures shown in between the blue and red lines show the pressure difference for the year over which the number is shown. In other words, the fourth year there should be, providing we have this cast-iron barrier around the tract pressure difference of something like two hundred ninety-one pounds, if the wells were produced like they were in 1953. Thig goes up to a maximum pressure difference in the tenth year of four hundred five pounds; twelth year, four hundred three pounds and gradually declining the fifteen year to three hundred eighty-three pounds. This indicate to me, on the basis of my reserve study, that if these

wells, these eight wells in question produce as they were allowed to produce in 1953 there is a possiblity of drainage.

Q You are not assuming a cast-iron barrier, are you, Mr. Utz?

A I have no reason whatsoever to assume a cast-iron barrier or any other type of barrier.

Q Mr. Utz, this example you pointed out and as shown in Exhibits Four, Five, Six, and Seven, would this be in any manner unique in the Blanco-Mesaverde Pool or would you expect to find that elsewhere in the Pool?

A No, this will occur, there is a possibility that this same example occurs in several other places in the Blanco-Mesaverde Pool. The only reason we used this example was that the production stood out so.

Q Could you expect, a couple of points where you might expect it would reoccur regular that there is not a greater than two to one ratio net pay, for instance, between the two off-set wells?

A The area shown in Exhibit Nine, as the red area and two brown areas in Section 31, 10 on the South Boundry of 32, and 11 are areas where the example is shown.

Q Mr. Utz, will you explain Exhibits Eight and Nine? I believe they were made by Mr. Arnold, were they not?

A They were prepared by Mr. Arnold and his staff by information furnished by me.

Q You have checked them as to accuracy and are satisfied to their accuracy?

A Yes, I have.

Q Would you explain those exhibits to the Commission.

A Exhibit Eight is a map showing contours of equal deliverability

for the Mesaverde formation, in the Blanco-Mesaverde Pool I should more properly say. For 1953 deliverability tests corrected to five hundred pounds guage line pressure. The area in white is from zero to a hundred, and the area in yellow one hundred to five hundred MCF per day; green, five hundred to a thousand; gray, a thousand to two thousand; brown, two thousand to three thousand; red, three thousand to five thousand; purple, five thousand to ten thousand; and black over ten thousand. In Exhibit Nine we have prepared, or rather Exhibit Nine shows contours of equal production. This map is contoured to the same intervals as the deliverability map. In other words, the color code for the different ranges is precisely the same as on the deliverability map. These maps were prepared by us for the purpose of analyzing and comparing the production in 1953 average well production against the deliverability or capacity of the well by areas. In other words, for us to see what areas these variations existed in.

Q There is a disparity shown, is there not, in some cases between the capacity of the well to produce and the actual production?

A Yes, as between groups shown on these maps. This graph as shown in Exhibit Ten is a graph prepared on a linear scale showing the relationship between the two maps. In other words, the vertical is the Deliverability Load Factor. It is the deliverability to the deliverability group as compared to the production for that group for 1953. In other words, it is a deliverability divided into production. It is shown as a percentage relationship. The percentage relationship of deliverability as between groups of wells again shows no particular rhyme or reason. Group one being on a round sixty-two percent to a minimum in group six, which is from

three thousand to five thousand, as low as about twenty-nine percent. Had the take been ratable, this curve should have somewhat a sloping curve. At least it would not joggle up and down.

Q Mr. Utz, how many wells did you study, do you know? Do you have that figure contained in Exhibits Eight and Nine?

A Yes, I do on the production map there was five hundred six wells studied. On the deliverability map we studied three hundred twenty-four wells. Actually there were deliverability tests taken on twenty-seven more wells but these were discarded and thrown out by me for the reason that I didn't think they were accurate.

Q Exhibit Ten was prepared by you in person, was it not?

A Yes, it was.

Q Do you have anything further you wish to say in regards to Exhibit Eight, Nine, and Ten?

A No, I don't believe I do.

Q Mr. Utz, on the basis of your study and of the other studies that you have made, do you believe that the potential productivity in the Blanco-Mesaverde Pool is in excess of the reasonable market demand at the present time?

A Yes, I do. This figure I am about to give you is as of January 1, 1954. At that time there were five hundred forty-eight wells reported to the Commission as being producing Blanco-Mesaverde wells with an average deliverability of one thousand forty a piece. Based on this information, I estimiated that the deliverability for the Blanco-Mesaverde is five hundred sixty-seven, five hundred sixty-nine million per day. As previously stated, the daily average taken from both pipeline in 1953 was 183,069 MCF per day. The

The maximum take reported to us for any month is approximately four hundred ninety MCF per day.

Q Mr. Utz, do you believe on the basis of your study, that a proration formula of some nature is necessary, that proration is necessary in the Blanco-Mesaverde Pool?

A On the basis of my study of 1953 production and deliverability, and the method in which these wells produced, I believe that the take was non-ratable, and proration is in order.

MR. KITTS: Mr. Chariman, we offer in evidence Exhibits Three, Six, Seven, Eight, Nine, and Ten.

MR. SPURRIER: Is there objection. Without objection they will be admitted.

Q Mr. Utz, are there any further observations you wish to make in connection with the exhibits about which you have testified or to the basis of your studies?

A No, I believe I have had my say.

MR. KITTS: I believe also for the record colors subjective, that Mr. Utz referred to the colors as blue and red and I referred to it as purple and orange. That is all I have.

MR. SPURRIER: Does anyone have a question of Mr. Utz? Mr. Howell.

CROSS EXAMINATION

By MR. HOWELL:

Q Mr. Utz, you are familiar with the fact, are you not, that during 1953 a number of wells were being completed and going into initial production and initial pipeline connections?

A Yes, I am.

Q And that so far, certainly, as El Paso Natural Gas Company

is concerned the market demand throughout the greater part of the year was in excess of the deliverability during 1953?

A Your production curve would possible indicate that, yes.

Q As a matter of fact, you are familiar with the fact that the wells connected to El Paso Natural Gas Company system during 1953 were allowed to produce what they could make in order to attempt to meet the market?

A I wouldn't say that was true in all cases, no. As shown by the deliverability curve this group of wells went down, this group of wells went up.

MR. FOSTER: What exhibit are you referring to?

A Three.

Q You don't know of any wells that were shut-in attached to that line?

A No, I don't but I suspect they were wells that could have produced more if the line pressures were sufficent that they could have.

Q But under the conditions which existed in a developing field, those wells were producing all they could make?

A Insofar as line pressures would allow them to, yes.

Q Under those conditions, you know of no wells that, in the field conditions, were cut back in the year 1953 that were attached to El Paso's line cut back or shut-in?

A I know of no wells that were shut-in except by excessive line pressures.

Q That would be at times the line pressures would vary in operations?

A That is right.

Q And there was no switching whereby the wells were turned off, that you know of?

A Not that I know of, no.

MR. HOWELL: That is all.

MR. SPURRIER: Mr. Smith.

MR. SMITH: At this time I would like to withdraw the objection I made to the introduction of the exhibits formerly offered in evidence in view of the purpose they were now being offered. My purpose in making the objection was to point up to the Commission the necessity to have substantial evidence in the record to support any proration order they may enter. If the basis for the study or the basis for the calculation of the formula are based upon factors which are not within the statutes then in my opinion the order would not be supported by substantial evidence. I just wanted to make that point to the Commission for their consideration when they determine the allocation formula.

MR. SPURRIER: Thank you. Mr. Gorham.

By MR. GORHAM:

Q Mr. Utz, I would like to make reference to Exhibit Number Six. It is correct to state that if the reserves are quite different from one well to another that such potential drainage would not necessarly take place as a result of the other exhibit which would so indicate?

A Which other exhibit are you referring to?

Q The top exhibit to the left, Exhibit Number Seven. Let me restate the question.

A I wish you would, please.

Q The predication of the possibility of not having correlative rights being expected upon Exhibit Six and upon Exhibit Seven is based upon the fact that the reserves between the orange and the blue are comparably the same, is that correct?

A That is correct.

Q Now, are you aware that geologists, consulting geologists in the area have given extremely wide differences of opinion as to the amount of reserves from one well to another and that in particular areas they have shown a very high ratio difference between on e well and another?

A I am aware of the fact that Delhi just testified there was sixty-three million acres here and down in section 16, 4.7.

Q Are you aware that Well Number "X" is completed in the Cliff-house and Menefee zones only?

A Well Number "X"?

Q Yes.

A I believe that well "X" has something like four hundred feet of open hole. According to our company geologist, it was probably bottomed somewhere in the Point Lookout.

Q Other companies who have an interest in the well--let me rephrase that as a question, please. Since you are talking about an interval that is open hole, is it quite possible that one could have four hundred feet of open hole below the point where the casing is set and still not take it in the entire section especially in view of the fact that the casing was set well above the so-called Cliffhouse?

A That could be possibility, however, the information that I received didn't indicate, I don't really recall what it did indicate, but it didn't indicate that the pipe was set excessively above the

Q Are you aware that well "X" is one of the wells that falls out of line in deliverability with respect to all the previous exhibits and anyway, Phillips Exhibit No. Four.

A May I see Phillips Exhibit No. Four?

Q Is that well "X" which under deliverability is out there at fifteen million and under production in MCF per day is around one hundred forty million?

A Well--

MR. HOWELL: You are looking at different exhibits.

A This is what I have marked Exhibit Four, I believe it is the same exhibit.

Q That is right. I believe there is an "X" out there that we might construe as well "X".

A Well, it could likely be--I don't know what it is.

Q Is it not also possible that the ratio that has previously been given between deliverability and IP in considerably in error with respect to this well "X" with, as I remember, an IP of bottomed somewhere in the Point Lookout.

Q Other companies who have an interest in the well--let me rephrase that as a question, please. Since you are talking about an interval that is open hole, is it quite possible that one could have four hundred feet of open hole below the point where the casing is set and still not take it in the entire section especially in view of the fact that the casing was set well above the so-called Cliffhouse?

A That could be a possibility, however, the information that I received didn't indicate, I don't recall what it did indicate, but it didn't indicate that the pipe was set excessively above the

main sand body.

Q If the well was completed only in the Cliffhouse and the Menefee, and if the well in the process of completion in the Cliffhouse gauged six million cubic feet natural in the Cliffhouse and increased progressively hour by hour and day by day down to that point which is questioned as to whether or not it was Point Lookout or Menefee to a total natural flow of twenty-three million five hundred thousand, is it reasonable to assume that particular sand in the Menefee were contributing gas to the well bore?

A I would say that it could indicate that. It could also indicate fairly continuous fracs.

Q Well, if it were fractured in the Menefee obviously the gas would be coming from the Menefee, is that correct?

A That could be a possibility, but it also could not be a possibility.

Q Are you familiar with the fact that all the surrounding wells that were completed in the similar manner of completing were gas down to the Point Lookout or the basal Menefee, in most cases those wells--excuse me, are you familar that those wells which were completed around the particular well "X" in question in the same manner had no excessive amounts of gas recorded in the Menefee and no time did those wells as a natural guage have an initial potential of over three million cubic feet.

A I am not aware of the gas increase as the wells were drilled, if that is the question you are asking. However, I am aware of the fact that these cross-sections do not indicate only what we have shown.

Q My final question is this: If the sand in the Menefee were

contributing gas in well Number "X" and continued to contribute gas in well Num er "X" from the Menefee and those particular zones did not contribute appreciable amount of gas in the off-set wells, can it safely be said in all probability that well Number "X" has higher reserves?

A That is a possibility. But, I would like to call your attention that if I doubled reserves on Well "X", I would still get much the same thing over here in my final analysis. In other words, this curve would fall somewhere along here with twice the reserves. This curve would fall slightly above this curve somewhere in this vicinity. Slightly above the red curve on the righthand side of Exhibit Seven at a place approximately one quarter of the distance. On the left side at a point approximately one quarter of the distance below the red curve and indicated for Well "X".

Q Would that condition possibly exist also if the reserves were in actuality ten times the reserves as compared to some of the off-set wells?

A Reserve ratio between off-sets of one to ten?

Q Between the off-sets and well "X" if they were above ten times?

A What you are actually asking me, I believe, is if the reserve ratio between the average off-set and the Well "X" was ten times would that condition exist?

Q That is the question.

A No, it would not. The production was only 908 as compared to 4606.

Q In other words, if the ratio of ten to one were in existence or a ratio that was higher than ten to one were in existence it is quite possible that Well "X" would draw only its reserves and should

be entitled to that higher percentage of market?

A Your question is hypothetical. If the reserves varied in that proportion, yes.

Q Thank you.

A I don't agree they do however.

MR. HOWELL: That is all.

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

MR. JONES: Just one question, Mr. Utz, strictly for information. What abandonment pressure did you use in calculating recoverable reserves, than one hundred pound wellhead?

MR. BARNES: I have one question, Mr. Utz. To your knowledge, has there ever been any tests run in the Blanco-Mesaverde Pool that conculsively demonstrated drainage or intereference between wells in the Mesaverde formation.

A I know of no tests that have been run except the indication that was given by Pubco here.

MR. BARNES: That is all.

MR. SPURRIER: Mr. Maxwell.

By MR. MAXWELL:

Q Mr. Utz, I would like to discuss well "X" a little bit too. I am presently much in the dark about it.

A I would gladly enlighten you in any way I can, Mr. Maxwell.

Q Are you aware that well "X" is one of the wells that falls out of line in deliverability with respect to all the previous exhibits and anyway, Phillips Exhibit No. Four.

A May I see Phillips Exhibit No. Four?

Q Is that well "X" which under deliverability is out there at fifteen million and under production MCF per day is around one

hundred forty million?

A Well--

MR. HOWELL: You are looking at different exhibits.

A This is what I have marked Exhibit Four, I believe it is the same exhibit.

Q That is right. I believe there is an "X" out there that we might construe as well "X".

A Well, it could likely be--I don't know what it is.

Q Is it not also possible that the ratio that has previously been given between deliverability and IP is considerably in error with respect to this well "X" with, as I remember, an IP of twenty-three million eight hundred thousand and a deliverability of fifteen million plus. It seems to me that the ratio falls somewhat out of line, is that not correct?

A Yes, it falls somewhere on the line, however, I have hesitated to use IP because of the manner in which IPs have been run over the period of years.

Q Do you have any question at all about deliverability values as I have received them?

A On the particular well you have in question, I believe it was a fair test. I have made the correction in friction and find that the well in my opinion had the ability to produce that much gas.

Q You feel that if the line pressure were reduced to five hundred well pounds or half of the shut-in pressure that you would get out of that well into the line in excess of fifteen million?

A At the time that the deliverability tests were taken I believe it would have.

Q I am at considerable variance with that but--

A I have no reason to question the information that was explained to us by El Paso on deliverability test.

Q No, that is the best information we have at this time, but it certainly doesn't conform with the majority of the deliverabilities in the field, should I say probably ninety-eight percent of the deliverability production and IP figures that we have, this well is way out of line.

MR. SPURRIER: Is that a question?

A It is an exceptional--

Q Is it out of line? Another thing Mr. Utz, on your deliverability projection graph, are those red, is that red line actual pressure decline as you have found it so far? Is there any point on that red line that is an actual pressure production figure?

A No, that is a projection based on the factors which I explained. It is taken, the wellhead pressure is taken from the decline curve on the graph. The method I used in this production projection was the graphic method. Any point of production you can pick off your wellhead pressure.

Q There are no actual pressure figures obtained from field data that fall on that red line for well "X"? We are talking about one well. Do you have one point on that line that is actual pressure your reduction that has been reported from the field?

A For the amount of gas produced? Q Yes.

A I could go into more detail on that but I hoped I wouldn't have to.

Q I am asking if you had one point on it or if it is strictly hypothetical?

A I have the October 4th shut-in pressure.

Q 1953?

A 1953, yes.

Q That is the shut-in pressure taken at the time of the deliverability?

A That is right.

Q Do you also have the average of the other seven wells?

A Yes, I do.

Q I believe that the average on this well "X" shut-in pressure is higher than the average of the other s even wells.

A I agree that it is. Do you want to go into it farther or do you want to quit here?

Q Well, I believe the pressure is a measure of reserves.

A I agree with that.

Q It is strictly a hypothetical curve you have there?

MR. SPURRIER: Is it, or isn't it?

A It is a curve as I explained, which was taken from the decline curve on the graph. I wouldn't exactly say it was hypothetical. It was arrived at by the graphic method of mathematics which is a method of projection which is accepted by the Federal Power Commission and which I assume to be a reasonable engineering method of projecting deliverability.

Q If your reserve calculations, vary depreciably on you wouldn't expect nearly the differential that you have shown there.

A No, sir. If I doubled the reserve for well "X" I estimated about where the red curve would fall.

Q Do you recall exactly what the shut-in pressure was of October 1953?

A August 4, 1953 it was ten sixty-seven.

MR. SPURRIER: August or October?

A August.

Q What was the average pressure for the seven wells?

A Do you want the average pressure for the seven wells or would the four closet off-set be sufficient?

Q I wouldn't mind having both of them if you have the figures.

A It would take a little more time to get all seven. The average pressure for the seven off-sets was nine hundred. The four closet off-sets was nine hundred ninety-eight pounds. I would have to compute the pressure for the seven, the average pressure. I have individual pressures.

Q That is all right. Does not that indicate that there are less reserves under those other wells than under this well.

A No, not necessarily. That one indicates to me a lower permeability.

Q We are talking about recoverable reserves again.

A What length of time?

Q Over an economic period I presume. Do you have the figures of the amont of gas produced by the average, do you have any volume data MCF per pound or IP on the seven as compared to well "X".

A To be perfectly frank, I don't have the accumulative production for the seven wells. However, I do have it for well "X". Would you care to have it?

Q You don't have any comparison between the two?

A For the pressure drop per pound.

Q Yes.

A No, I have a study here that I made on well "X" as to what

the reserves would be if the pressure dropped in accordance with the shut-in pressures the initial shut-in pressure as compared with the shut-in pressure of October or August 4, 1953. The pressure dropped as corrected to bottom hole,/the initial as compared to the October 4th pressure was thirty-two pound drop. The cumulative production for well "X" was 197 MCF. This gives me a pressure volume produced per pound drop of 59,604,000 or 59.604. Using the average permeability and porosity as would indicate from the wells core data shown on Exhibit Six that would also indicate a net pay of something over 1100 feet. That would also indicate a reserve in well "X" of well over, well I will say 260 million per acre. I believe Delhi testified there was only sixty-three million per acre in Section ONe. The pressure drop would indicate then that well "X" had been producing more gas than it should have.

Q Would you say that due to the pressure that you found on the state test that other wells could possibly be draining well "X" because of the lower pressure indicated by your average of the seven wells surrounding that well?

A If you used those pressures without regard to common ordinary horse sense I would say it might.

Q In your opinion how long does it take to get established pressure or a relatively established pressure in the Blanco-Mesaverde?

A I believe data taht was used by the engineering committee when we promulgated the present deliverability indicated that it took up to six weeks for stabilization.

Q What percent of that pressure do you estimate you would get in seven days under the orders we operate on.

A That would depend on the permability of the well and the

fracturing system.

Q To a certain extent.

A And of the liquid content, of course, in the bottom of the hole.

Q On the average, what percent of build-up would you say these seven wells had knowing what you do about them, having your Exhibit Three and Four and your production history, what percent on those seven wells would you have of your maximum shut-in pressure in seven days' time?

A Well, without a pressure build-up curve I would only have to estimate it. I couldn't do anything else.

Q You seem to have some definite ideas on the subject that common sense would indicate a certain figure to you, could we have what figure you would estimate what would be?

MR. SPURRIER: Let's take a short rest while Mr. Utz figures.

(Recess)

MR. SPURRIER: The meeting will come to order, please. Before I forget it and before Mr. Utz goes back on for cross-examination, I have been told that I have said that there would be no oral arguments in this case. I not only haven't said it, but you can't find it in the record. We do not intend that you are not allowed to make oral arguments. You have that right and if you want to exercise it, we will sit here and listen, at least, I will be here if it takes all next week. We did say, as I remember, that we would rather you would file statements if you wanted to make statements. We didn't, as I remember, even mention the word oral argument. It is your choice. I will be here until you get through. Any other question of Mr. Utz?

MR. MAXWELL: I would like to have the answer to the one we recessed on.

A As I recall, you asked me for an opinion as to what the percentage of build-up was on the four off-set wells, is that correct?

A I--Yes, sir.

Q I estimate it is probably in the neighborhood of 90 to 93 percent which would give the off-set wells approximately the same shut-in pressure as well "X".

Q The, so far, there is no drainage one way or the other?

A In all my palavering here I haven't accused anybody of draining anybody else. I am merely saying that until we change the way of producing, there is a good likelihood there will be drainage.

MR. MAXWELL: I believe that concludes my remarks.

MR. SPURRIER: Anyone else? The witness may be excused. Am I right, that that concludes the Commission's case?

MR. KITTS: That is right.

MR. SPURRIER: To go a little further on this oral argument proposition, these statements I spoke about, I think it is clear in the record that we will expect them by July tenth, is that right? Any further testimony in this case? Does anyone have oral arguement? I might bring out this point. In many cases, where a long case is presented particularly, there is no Commission present. You have had a Commission present for most of this. NOt all of this. So, I am only saying that to illustrate that there is probably a slight difference here between some other Commissions, but you are still wide open to make your statements and/or your oral argument. Does anyone have any more testimony before we begin those arguments?

MR. KEELAHIN: Before the oral argument, I would like to have

the record show so that it would have some semblance of legal standing, that I would like to submit oral statements in behalf of Tom Bolack, W. P. Carr and Lowry, et al., Operating Account. We have not participated in this hearing up to the present time and therefore our names would not appear in the record. I do wish to make that statement.

MR. SPURRIER: Anyone else? Mr. Barnes.

MR. BARNES: I would like to make a similar statement in regard to King-Loc Petroleum Company and Candado Production Company. We have not participated in the hearing insofar as presenting any testimony is concerned. We have followed the proceedings very closely, also the meetings of the Engineering Sub-Committee and we will wish to present a statement even though we did not present any testimony.

MR. SPURRIER: Does anyone have oral argument? I presume that the testimony is in and the case is closed. Unless I am otherwise informed in a few moments that is what the record will show. The case will be taken under advisement.

STATE OF NEW MEXICO)
: ss.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 14th day of July, 1954.

Ada Dearnley
Notary Public, Court Reporter

My Commission Expires:

June 19, 1955