BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 13 & 14, 1974

COMMISSION HEARING

IN THE MATTER OF:	
Application of El Paso Natural Gas Company for the amendment of Order No. R-1670, Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico.	Case 5264

BEFORE: A. L. Porter, Secretary-Director

I. R. Trujillo, Chairman

Alex J. Armijo, Member.

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the New Mexico Oil Conservation Commission: William Carr, Esq.
Legal Counsel for the Commission
State Land Office Building
Santa Fe, New Mexico

For El Paso Natural Gas: William Federici, Esq.
MONTGOMERY, FEDERICI, ANDREWS & BUELL
350 East Palace Avenue
Santa Fe, New Mexico
and
Richard S. Morris, Esq.
John B. Chapman, Esq.
Counsels for El Paso Natural Gas

APPEARANCES (Continued)

For Southern Union Production Company:	Jack M. Campbell, Esq. CAMPBELL & BINGHAM 121 East Palace Avenue Santa Fe, New Mexico and William S. Jameson, Esq. General Counsel Southern Union Production Co. Dallas, Texas
For Mesa Petroleum Co.:	Clarence Hinkle, Esq. and Harold Hensley, Esq. HINKLE, BONDURANT, COX & EATON Hinkle Building Roswell, New Mexico and Richard C. Byrd, Esq. ANDERSON, BYRD & RICKERSON Ottawa, Kansas and Ed H. Selecman, Esq. General Counsel Mesa Petroleum Company
For Aztec Oil & Gas Co.:	Clarence Hinkle, Esq. HINKLE, BONDURANT, COX & EATON Hinkle Building Roswell, New Mexico and Kenneth A. Swanson, Esq. General Counsel Aztec Oil & Gas Company
For Atlantic Richfield Union Oil Co. of Ca. Amerada Hess Corp.:	Clarence Hinkle, Esq. HINKLE, BONDURANT, COX & EATON Hinkle Building Roswell, New Mexico

APPEARANCES (Continued)

For Clinton Oil Co.:	Clarence Hinkle, Esq. HINKLE, BONDURANT, COX & EATON Hinkle Building Roswell, New Mexico and Robert C. Spurlock, Esq.
For Amoco Production Co.:	Oscar Swan, Esq. ATWOOD, MALONE, MANN & COOTER Security National Bank Building Roswell, New Mexico
For Southern Union Gas Co.:	Richard N. Carpenter, Esq. BIGBEE, BYRD, CARPENTER & CROUT Suite 200, Bokum Building Santa Fe, New Mexico and A. S. Grenier Jack Hertz Dallas, Texas

INDEX

E X H I B I T S

	Offered & Admitted
Commission's Exhibit 1	26
El Paso's Exhibits 1 through 10	79
El Paso's Exhibit 11	(not admitted)
El Paso's Exhibit 12	(not admitted)
El Paso's Exhibits 13 through 21 and 13-A	211
Aztec's Exhibits 1, 1-A, 1-B &2	248
Mesa's Exhibits 1, 2 & 3	259
Supco's Exhibits 1 through 7	291

MR. PORTER: Case 5264.

MR. CARR: Case 5264. Application of El Paso Natural Gas Company for the amendment of Order No. R-1670, Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico.

MR. PORTER: At this time, I would like to call for appearances in this case.

MR. FEDERICI: If the Commission please, on behalf of the Petitioner, El Paso Natural Gas Company, William Federici of Montgomery, Federici, Andrews and Buell. Mr. Richard S. Morris and John B. Chapman, counsel for El Paso Natural Gas.

MR. PORTER: Thank you.

MR. CAMPBELL: Jack M. Campbell, Campbell and Bingaman, Santa Fe, New Mexico, appearing on behalf of Southern Union Production Company. Mr. William S. Jameson, General Counsel, Southern Union Production Company of Dallas.

MR. PORTER: Mr. Hinkle?

MR. HINKLE: Clarence Hinkle and Harold Hensley of Hinkle, Bondurant, Cox and Eaton. We would like to enter an appearance for Mesa Petroleum Company, and in connection with Mesa, we are associated with Richard C. Byrd

of Anderson, Byrd and Rickerson of Ottawa, Kansas and Ed H. Selecman, General Counsel for Mesa out of Amarillo. I would like to introduce these gentlemen.

I would also like to enter an appearance for Aztec Oil and Gas Company and in connection with Aztec, we are associated with Mr. Kenneth A. Swanson who is Vice President and General Counsel for Aztec.

We would also like to enter an appearance for Atlantic Richfield Company.

MR. PORTER: Mr. Kellahin?

MR. KELLAHIN: If the Commission please, Jason Kellahin of Kellahin and Fox, Santa Fe, appearing for Clinton Oil Company. I am appearing in association with Mr. Robert C. Spurlock who is a member of the Oklahoma Bar and will participate on behalf of Clinton.

I would also like to enter an appearance for Union Oil Company of California and Amerada Hess Corporation.

MR. CARPENTER: Richard N. Carpenter of Bigbee, Byrd, Carpenter and Crout, Santa Fe, New Mexico, entering an appearance for Southern Union Gas Company along with A. S. Grenier and Jack Hertz of Dallas, Texas.

MR. SWAN: Oscar Swan, Denver, Colorado. I am associated with the firm of Atwood, Malone, Mann and Cooter

of Roswell. They have entered an appearance. I am appearing on behalf of Amoco Production Company.

MR. PORTER: Are there any other appearances?

At this time the Commission will recognize Mr. Morris for the Applicant.

MR. MORRIS: If the Commission please, El Paso is ready to proceed in this case by presentation of evidence in support of our Application. We will have two witnesses, Mr. A. M. Derrick and Mr. A. F. van Everdingen and at such time as the Commission is prepared for us to proceed with our case, we are ready.

MR. PORTER: Thank you, Mr. Morris. We have two motions for continuance of this case filed by Mesa and Aztec, and I have a letter that I wrote concerning this matter to Mr. Paul J. Kelly, Jr. of the Hinkle firm dated July 16 in which I said that it is the Commission's decision that arguments on the Motion for Continuance will be heard at the beginning of the Hearing on August 13th. I also indicated that arguments by each participant would be limited to 30 minutes.

Now, Mr. Hinkle, would you like to argue your Motion for Continuance at this time?

MR. HINKLE: Mr. Byrd is here for Mesa and I

will let him precede me for Mesa.

MR. PORTER: The Commission will recognize Mr. Byrd.

MR. BYRD: Mr. Chairman, members of the Commission, Mesa Petroleum Company is a producer in the Mesaverde Pool and has an interest in 450 wells and is operator in a number of these wells. As stated in our Motion for Continuance, shortly after this Application was filed, the Federal Power Commission issued a national area rate-holder opinion, Order 699, and in that Order they indicated literally, at least, that gas produced from wells drilled on and after January 1st, 1973, would be subject to the new national area rate.

Now, Mesa's position is, that in view of the fact that the Applicant here seeks permission to drill an additional well on each unit in the pool, that until such time as Mesa can ascertain for sure what price they are going to receive for the production from new wells, that it is impossible for them to decide what their position will be in regard to El Paso's Application. I notice this Commission does not concern itself with the price of gas, that it is through the jurisdiction of the Federal Power Commission, but in this particular situation

that exists in this pool, I think the Commission is aware that the producers are in different positions. For example, the Applicant, El Paso, is both the purchaser and producer. If I interpret the rules and regulations under which they operate as far as the Federal Power Commission is concerned, on leases which they acquired prior to 1969, they receive cost of service treatment in the rate-making procedure before the Federal Power Commission. Thus, El Paso will be in a position to include in their cost of service in a rate case before the Federal Power Commission, the additional expense of drilling another well on the unit; whereas, Mesa and the other independent producers in the field are not in that position. They are regulated on an area-rate basis, either the national-area rate or the present existing rate for this particular field. The firm rate is around 24¢ MCF.

Now, the purpose for our Motion for Continuance is to wait until the Federal Power Commission interprets their opinion 699 so that Mesa and the other independent producers could ascertain whether they are going to get 24¢ or 43¢ plus for the gas from the new well. It makes all the difference in the world as to economics of drilling another well on the unit. In view of the fact that

El Paso is not in the same situation and can possibly drill wells on their unit even though they didn't receive a higher price, it would create a situation where drainage could occur and correlative rights could be violated.

I think the Commission is somewhat aware of the problem because I did receive a copy of the letter that the Commission wrote to the Federal Power Commission requesting an opinion as to what their interpretation of the Order might be regarding gas produced from new wells on previously dedicated acreage as is involved in this field.

Unfortunately, the Federal Power Commission hasn't responded to your inquiry or I am not aware of it. They did, on August 2nd, issue an amendment to 699, but they did not answer the question that is involved in this proceeding. They broadened their interpretation a little bit, but they didn't specifically address themselves to the question of the applicability of the national-area rate to new wells on previously dedicated acreage. I read in some trade journals that as of Monday, they have scheduled oral arguments on all of the Motions for Reconsideration of Opinion 699 and those are set for argument on August 22nd and 23rd in Washington. I have

been advised by people that are monitoring the proceeding that at least two pipeline purchasers have raised the specific question which the Commission raised in its letter to the Commission, and that is the applicability of the new rate to wells drilled on previously dedicated acreage.

As I stated in my Motion, the position that we are in, we don't know whether to jump or sit. We can't really determine how this thing will effect us from an economic standpoint until we get an answer to the question as to what the price is going to be and I would respectfully move the Commission to continue the matter until the Federal Power Commission has determined that particular issue. Thank you.

MR. PORTER: Mr. Hinkle?

MR. HINKLE: The Motion of Aztec for Continuance is based principally on two things: First, critical shortage of tubular goods and the availability of the rigs to carry on extensive drilling programs. Second, and the main thing is an extended drilling program at this time would actually cause the violation of correlative rights as indicated by Mr. Byrd.

This is a very important case, not only for the

Commission, but for the State of New Mexico. The Blanco Mesaverde Pool covers some 900,000 acres in which there are some 2050 wells under production. Under the present rule, there is 320 acres dedicated to each well, and, of course, approval of this Application necessarily means that it might be necessary to drill 2050 additional wells. This would involve a large expenditure. If you figure $150,000 a well, 2000 wells is $300 million. To obtain the necessary rigs and the drilling equipment, the tubular goods to drill this many wells in normal times would be quite fast, but this is not -- we are not in normal times. It is a matter of common knowledge that the obtaining of tubular goods is very critical. It is my understanding that the supply companies are allocating tubular goods on the basis of their customers during the preceding year.

Aztec did not drill a great many wells during last year. They have other drilling commitments and in their consideration of this matter, it would not be possible for them to drill very many wells this next year, possibly 12 at the most.

Aztec has an interest in some 500 wells in the Mesaverde Pool. They are the operator of 130 wells. This means that they will be obligated, if this Order is

approved, to drill an additional 130 wells which is a lot of wells.

The records of this Commission show that El Paso owns or operates wells on the most prolific units in the whole pool. That is, they have the greatest potential. Due to this situation, El Paso could jump in and drill 30 or 40 wells in quick order on these units that have the greatest potential. Of course, this would go a long way to meet the deliverability requirements of El Paso. At the same time, these wells would offset units owned by other operators which would require an immediate offset and if these offsets were not drilled, of course, it would violate correlative rights. The question is, under the present situation where you cannot obtain tubular goods readily as to whether or not these obligations can be promptly met.

In addition, a rapid drilling program if El Paso hopped in and drilled all of these wells in the most prolific part of the Pool and the offset obligations could not be met, it would mean that there would be drainage as far as the outlying areas are concerned, and of course, again, this would violate correlative rights.

We think that the Commission should take notice

of the fact that a large portion of the land in this pool are Federal lands, and of course, in every Township there is at least four sections of State land involved. Now, if these offset obligations cannot be met, of course, the State's interest is going to be vitally affected due to the fact that the State has a 37½ percent overriding royalty interest as far as the Federal lands are concerned, and of course, they have all of the royalty as far as the State leases are concerned.

As pointed out by Mr. Byrd, El Paso is acting in a dual capacity as a producer and purchaser of gas and the Application surely shows that all gas produced and purchased enters the interstate pipeline system and that most of the gas is delivered at the California-Arizona or California-Nevada line.

Now, the problem, as we understand it, of El Paso is deliverability and all they are asking the other operators to do is to help them meet this additional deliverability so that they can ship State gas out of State.

Now, there has been no waste committed so far by a delay in the further development of the pool, and an additional delay of a few months is not going to permit waste and there is not going to be any derogation of rights.

As I have stated, due to the present situation, the inability to obtain drilling rigs, tubular goods, we think that it is highly advisable that the Commission defer consideration of this matter for at least a reasonable time and we, in the Motion, have requested six months.

There is one other matter which I would like to mention in closing. Aztec in its study of the entire situation has come to the conclusion that probably the only way that correlative rights are ever going to be protected in this large pool is through unitization. Now, it is our understanding that there will be a Bill introduced at the next session of the Legislature which will provide for compulsory unitization. That is only less than six months off, the meeting of the Legislature. We think it would be highly desirable to wait until after the Legislature meets before entering an order in this case to give them an opportunity to pass such an act and if it is passed to wait a reasonable time to see if this area cannot be unitized because, as I stated, in our opinion, this is the only way that correlative rights can ever be fully protected.

I entered an appearance in this case for Atlantic Richfield and I would like to make a brief statement on

behalf of Atlantic.

Atlantic Richfield Company is an operator in the Blanco Mesaverde Pool which is the subject of this cause. In view of the short supply of tubular goods, building supplies and the availability of drilling rigs, it is Atlantic Richfield's recommendation that this Hearing be continued or no Order be issued for at least one year. They go a little further than we do. They would like to have a year. To issue an Order at this time in the face of such shortages will undoubtedly result in a violation of correlative rights. It is our belief that within a year these shortages will not be as critical as they are now.

MR. PORTER: Governor Campbell?

MR. CAMPBELL: Before the Applicant responds to the Motion, I think it is appropriate that for Southern Union Production Company, I rise to support the Motion for Continuance. On July 18th, 1974, this Commission addressed a letter to the Federal Power Commission in which doubts were expressed as to the interpretation of Opinion No. 699 as related to the Application in this case. In that letter, the Commission raised two questions: First, the basic question is the national rate for sale of

natural gas from wells commenced after January 1, 1973 applicable to sales of gas from wells drilled after January 1, 1973, on leases, the reserves of which have already been dedicated to the interstate market by pre-existing contracts.

If the answer to this question is affirmative, the second question arises: Shall proportion of gas from the lease to receive the new rate be determined on the basis of actual measured production from the new well or on the basis of that well's proportional deliverability?

In view of this uncertainty, Mr. Chairman, which goes not only to the Commission, but perhaps in greater measure to producers in the field, who have to evaluate their own situation and determine their position in this case, both in terms of cross examination of Applicant's witnesses and in the preparation and presentation of their own cases in addition to the basic consideration of support or opposition, in view of that, it seems to us unwise to proceed with any of the case until such time as this matter is by the Federal Power Commission clarified either by response to this Commission's letter or in its Order following the Motion for Re-hearing which has been filed and which Mr. Byrd advises have raised this very

question.

MR. PORTER: Does anyone have argument for the Motion?

MR. CARPENTER: On behalf of Southern Union Gas Company, we do support the Motion for Continuance.

We call to the Commission's attention that this Order 699, which Governor Campbell pointed out, is subject to the determination of the Motion on Re-hearing next week. In this 699, the primary purpose of F.P.C. action as stated was to encourage the exploratory drilling and development of new reserves. I think on the face of this Application, this Application runs right in the face of the F.P.C. Order. In that, what it really seeks to do is to exploit faster known reserves rather than finding new reserves. I think that in the F.P.C. Order which has been referred to and also that the F.P.C. found that the new national rate together with the fixed escalation and together with biannual reviews which are provided for in that order, should give an incentive to producers to find new reserves and new gas supplies for the interstate market. We feel that Order should be given time to find out whether, in fact, it has efficacy or doesn't have efficacy before this Commission passes to the issue of

more rapid completion of existing reserves.

Our basic reason, Mr. Chairman and members of the Commission, and as you will hear, hopefully, at another date on our testimony, is that we are terribly concerned by the granting of this Application right now as to the effect it has on half-million consumers that Southern Union Gas Company serves in Albuquerque and Santa Fe and other areas in the northwest. For those reasons we do support the Motion for Continuance, Mr. Chairman.

May I address a question to the Chair at this time as to whether it would be possible to have your letter of July 18th introduced into the record since it has been referred to as Commissions's Exhibit No. 1?

MR. MORRIS: Mr. Commissioner, may I be heard on that request as part of my response to the Motion?

MR. PORTER: Surely, Mr. Morris. Does this conclude the arguments in support of continuance?

Mr. Morris?

MR. MORRIS: If the Commission please, I announced on behalf of El Paso at the outset of this case that we are ready to proceed with the presentation of our evidence. We believe all the parties who are now here before the Commission have been certainly given ample notice, ample time to

prepare their case and I believe even those who have moved for continuance have been notified by the Commission to come to this Hearing and be prepared to proceed with the presentation of evidence. We fully subscribe to the position that this case should go forward at this time.

With regard to the Federal Power Commission's Opinion No. 699 establishing the national area rate, I would like to recall for the Commission that it was over two years ago in early 1972 that El Paso first brought to this Commission its application for infill drilling in the Blanco Mesaverde Gas Pool. El Paso at that time could see the need for infill drilling, the technical feasibility for infill drilling and certainly the need for developing the additional reserves and deliverability that we believe the infill drilling program will generate.

The situation that prompted us to bring that application to the Commission at that time is with us today in even more critical terms. In the sense that the supply picture facing the nation and certainly our market area--and we submit other market areas--is such that this program needs to proceed not only to develop the additional deliverability that the infill drilling program will produce, but we submit that, as will be shown

by our evidence in this case that substantial additional reserves will be developed by this program.

El Paso recognized some two years ago that even though the program was technically feasible at that time, there might have been some question as to its economic feasibility because of the lack of expression on the part of the Federal Power Commission concerning the new price that should be accorded for gas in the San Juan Basin. At that time, the Commission will recall the Federal Power Commission had not yet entered its order in the Rocky Mountain area rate proceeding. Price levels were still extremely low at that time. Since then we have had not only the Order establishing the rate for the Rocky Mountain area rate proceeding, of course, we have Opinion No. 699.

I will certainly be the first to recognize and acknowledge that Opinion 699 does not specifically say that the El Paso Application, with regard to the Blanco Mesaverde Gas Pool, or that infill drilling in the Blanco Mesaverde Gas Pool will be accorded the new rate for gas for wells drilled on and after January 1, 1973. It does not specifically address this specific project. We do believe very firmly -- I want there to be no mistake about

our view of this matter -- we think the Opinion 699 clearly and unmistakably provides the new price for the wells that will be drilled under this program. It clearly says that the new price applies to the wells commenced on and after January 1, 1973.

I think it is important for the Commission to recognize that the so-called vintaging concept was used by the Commission in this Order. That is, applying the new rate with respect to when wells are commenced is a market departure from what the Federal Power Commission had done in the past where its vintaging concepts had related to the dedication of the acreage and leasehold interests to the interstate market. It was the text of the Order, the whole background of the Order entered by the Commission in its Opinion 699 strongly supports the idea that that Order was intended to encourage operators to drill wells on acreage that was already dedicated to the interstate market and that the wells drilled on and after January 1, 1973, even on acreage already dedicated to the interstate market, nevertheless would be accorded the new national area rate.

Now, Mr. Carpenter addressed this problem in his argument where he said that we were flying in the face

of the philosophy of Order 699 because, as he put it, all we intended to do is exploit faster the known reserves in the field. I think that perhaps typifies the problem that the Commission here faces in trying to rule on a Motion for Continuance at this time and that is the Commission hasn't heard the evidence yet to know whether indeed that is what the evidence is going to show with respect to the infill drilling program in this field. I will represent to the Commission here and now that El Paso's evidence will show, we think very dramatically, that the infill drilling program will not only generate additional current deliverability, but it will also develop substantial additional reserves in the field, reserves which unless developed will amount to waste and which will amount to a violation of correlative rights of the owners and operators of the leases under which those reserves are located. Correlative rights are obviously being violated if the operators of those leases are not afforded the opportunity to develop and produce them.

The suggestion has been made that the Commission should wait until there is a clarification of Opinion 699. None of us know what may happen to us with respect to

Order 699. Undoubtedly there will be appeals of that Order. As I believe Governor Campbell pointed out and Mr. Byrd pointed out, there has been a re-hearing scheduled for August 22nd before the Federal Power Commission with respect to that opinion. At least oral arguments on the Motion for Re-hearing have been scheduled. We don't know what will develop from that. We don't know whether the Commission will consider upon oral argument that perhaps some increased price over and above the 42¢ base price might be considered. We don't know what modifications might be made or what additional proceedings the Federal Power Commission might enter into. What we do know is we now have an order. We now have an opinion that stands as an expression of the Federal Power Commission and until it is changed either by the Commission or by the courts, that for the first time in a long long time we have something upon which we can develop our estimates, develop our ideas with respect to the economic feasibility of this project, and the suggestion that this Commission should wait until all questions are clarified and I suppose until all appeals are exhausted, is really quite impractical, such a suggestion to this Commission. This Commission has responsibilities of its own which are

completely separate and apart from those that face the Federal Power Commission. We submit that the evidence that we will present here will show a crying need for the development program that we are suggesting and that this program needs to get under way just as soon as possible from several standpoints: Prevention of waste, protection of correlative rights and the development of the additional supplies that are needed for the needs of this nation.

Now, concerning the shortage of tubular goods and rigs, there is some shortage. I don't know to what extent this Commission is charged with or should consider those factors in discharging its responsibilities. By and large, the shortage of tubular goods and rigs is a matter, however, that amounts to ordering priority. We submit that the operators will put their tubular goods and rigs to use in those projects and in those areas of the country where it will be to their best advantage to do so. The idea that some operator will come before this Commission and say, "We don't have enough tubular goods to enter into infill drilling programs in Mesaverde," I submit is maybe just another way of saying, "We would rather use the available tubular goods and rigs perhaps somewhere else where we can see a better profit where we have what

we consider to be enhanced obligations or opportunities."

At the very least we submit to the Commission that it should go ahead and hear this case and decide this case so that then the operators who have limited tubular goods and rigs can know how to order those priorities. Certainly until the Commission acts, it further compounds the problem that every operator must face in knowing how to allocate its resources and supplies.

Finally, with respect to the suggestion that the Commission should wait until the Legislature might consider a unitization bill, I think this has some obvious drawbacks. One, it is some time until the Legislature meets and some further time until it acts and then who knows how long a time before the laborious process of unitization can be implemented.

We submit that our evidence in this case will show that neither the operators nor the Commission can wait that long until infill drilling programs should be allowed to proceed.

Thank you, sir.

MR. PORTER: Does anyone else want to speak against the Motion for Continuance?

(Whereupon, a discussion was held off the record.)

MR. PORTER: The Commission will admit the letter into the record. It is a letter directed to the Federal Power Commission by me.

(Whereupon, Commission's Exhibit No. 1 was marked for identification, and was admitted into evidence.)

MR. PORTER: We will have a short recess and rule on the continuance.

(Whereupon, a short recess was held.)

MR. PORTER: The Hearing will come to order, please.

The Commission has decided to overrule the Motion for Continuance. At this time we will ask the Applicant to have his witnesses sworn, and I believe I will ask whoever else desires to present testimony to have them all sworn at the same time.

MR. MORRIS: Mr. Commissioner, I will ask Mr. A. M. Derrick and Mr. A. F. van Everdingen to stand and be sworn.

MR. PORTER: You only have the two witnesses?

MR. MORRIS: Yes.

MR. PORTER: Governor Campbell?

MR. CAMPBELL: I have one witness, Mr. Sudesh Arore.

MR. PORTER: Mr. Hinkle?

MR. HINKLE: Aztec will have one witness, Mr. Tom Morris.

MR. BYRD: Mesa will have one witness, Mr. Chairman, Mr. Carnes.

MR. SWAN: Amoco will have one witness, Mr. Giles.

MR. CARPENTER: Southern Union Gas Company will have one witness, Mr. Oren L. Haseltine.

MR. PORTER: I will never pronounce that one right anyway. He has been coming to our hearings a long time.

(Witnesses sworn)

MR. PORTER: Mr. Morris?

MR. MORRIS: If the Commission please, I have pretty well given my opening statement in connection with our argument on the Motion for Continuance, so I am sure you will not be displeased to have me dispense with that for a change.

MR. PORTER: I appreciate any consideration.

MR. MORRIS: We call Mr. Derrick as our first witness. We will need a few minutes, if the Commission please, to put the official stamp on our exhibits.

(Whereupon, a discussion was held off the record.)

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

A. M. DERRICK

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Derrick, please state your name and business address?

A A. M. Derrick, P. O. Box 1492, El Paso, Texas, 79978.

Q By whom are you employed and in what capacity?

A I am employed by El Paso Natural Gas Company as Vice President in charge of gas supply.

Q In the El Paso Natural Gas Company, what activities are involved in the gas supply function?

A The gas supply group includes reservoir engineering, gas purchases and gas proration.

Q Mr. Derrick, even though you have testified previously before the Commission, again, would you briefly state your educational background?

A Yes. I have a Bachelor of Science degree in Petroleum Engineering from the University of Texas and a Master of Science degree in Petroleum Engineering from

the University of Houston.

Q What professional experience in the Petroleum industry did you have before joining El Paso Natural Gas Company?

A After serving as an engineering officer in the U. S. Navy during World War II, I joined Stanolind Oil and Gas Company which is now Amoco Productions in June of 1947, and with them I performed various field and office duties and later I was assigned to reservoir engineering. I worked in their Pampa and Wink field offices and in the general office in Tulsa, Oklahoma, and also, at the time I left Stanolind to join El Paso, I was in charge of reservoir engineering in the West Texas District Office in Midland.

Q When did you join El Paso and what has been your professional experience with El Paso?

A I joined El Paso in April of 1953 as a senior petroleum engineer. I was assigned to El Paso's Reservoir Engineering Department, and in 1960, I was made Manager of the Reservoir Engineering Department. In 1966, I was elected Assistant Vice President and in 1972, Vice President.

Q Are you a member of any professional organizations?

A Yes. I am a member of the Society of Petroleum Engineers of A.I.M.E., the Society of Petroleum Evaluation

Engineers and the American Association of Petroleum Geologists.

Q Mr. Derrick, you stated that you are in charge of the activities of El Paso's Reservoir Engineering Department, Gas Purchases Department and its Proration Department. Would you explain briefly the responsibilities of these departments?

A Yes. Our Reservoir Engineering Department determines the gas supply behind the Company's various sources of supply. This includes calculating reserves, availability,and our Gas Purchase Group follows the gas activities and development activities and they negotiate gas purchase agreements with producers, and our Gas Proration operations handles the proration matters. We handle the rules and regulations that govern our gas prorations.

Q Are you familiar with El Paso's application in this case, Case No. 5264?

A Yes, I am.

MR. MORRIS: Mr. Commissioner, are the witness' qualifications acceptable?

MR. PORTER: The Commission considers Mr. Derrick qualified to testify.

BY MR. MORRIS:

Q Please outline El Paso's Application in this case?

A El Paso is seeking to change the rule governing the drilling of gas wells in the Blanco Mesaverde Gas Pool in New Mexico. We would change these rules to permit the drilling of a second well in a 320-acre proration unit at the option of the operator and to cause the rules granting the allowables to be changed in such a manner that the deliverability of each of the two wells on a proration unit would be added together to determine the deliverability to be applied in the proration formula or assigning allowables in the Blanco Mesaverde Gas Pool. Also, in considering whether the well is marginal or non-marginal and also in balancing overproduction and underproduction, both wells would be considered as being produced from one proration unit.

Q Specifically what rules changes does El Paso propose?

A We have it outlined in an exhibit that I have prepared which we have marked as Exhibit 1.

(Whereupon, El Paso's Exhibit No. 1 was marked for identification.)

BY MR. MORRIS:

Q Mr. Derrick, referring to what has been marked as El Paso's Exhibit No. 1, would you just go through that exhibit? I won't ask you to read it, but please summarize the various rule changes that are set forth there?

A Yes. The first section there applies to well locations and acreage requirements. As far as the initial well that is presently there is concerned, we would leave that the same for future initial wells. That would be covered under Rule 2-A which would replace the present Rule 2. Now, we also propose the addition of a new rule to be known as Rule 2-B and in this one, the second well location is covered, and in there, we would propose that the second well in a 320-acre proration unit be drilled in the opposite quarter section to which the present well is drilled. Covering Rule 5-B, there the District Supervisor of the Commission should have the authority to approve the drilling of a second well.

Then we come down to Allocation and Granting of Allowables. Rule 9-E would be added and there, when we calculate the allowable for proration units containing two wells in accordance with Rule 9, the deliverability of the two wells on the proration unit would be added together and be used incalculating the acreage deliverability factor,

and the unit allowable could be produced from either or both of the wells.

The next is Balancing of Production. We propose Rule 15-K be added, and there again, for purposes of balancing overproduction or underproduction, both wells on the proration unit would be considered as one and the combined production from the two wells would be compared against the allowable.

On Classification of Wells, we propose that Rule 16-C be added, and here it indicates marginal or non-marginal. We would use the production from both wells in setting this classification.

The next is Section F which is Reporting of Production. We would propose that the production be reported by the individual wells and for the sum of the two wells located on the proration unit.

Q Mr. Derrick, just by further explanation, the underlining shown on Exhibit 1 represents new material. That portion of Rule 2-A which is not underlined represents the language of the existing rule?

A Rule 2, yes.

MR. NUTTER: Mr. Porter, before this proceeds further, I would like to point out that the proposed rules

are in variance to the advertisement of the case which was prepared from the Application filed by El Paso. In Rule No. 2-5-B, the wording here says the District Supervisor of the Commission to approve the drilling of the second well. The notice of the case which was prepared, as I say, in accordance with the Application provides that the Secretary-Director of the Commission will approve the drilling of the second well. I thought I would point that out.

MR. MORRIS: Mr. Commissioner, that was going to be my next question to the witness as to whether there is any change in the rules as shown on Exhibit 1 with those submitted in the Application. I will just state for the record that El Paso has no preference one way or the other, and if it would simplify matters as far as the advertisement of the case is concerned to consider Rule 5-B here as meaning the Secretary-Director rather than District Supervisor, we would ask that Exhibit 1 be considered amended at this time in that regard.

MR. PORTER: Mr. Morris, I believe it would be better if the exhibit is amended as suggested.

MR. MORRIS: I so move, Mr. Commissioner so that there be no difference between the rule as submitted with

the Application and the notice given in the case.

MR. PORTER: The Commission will accept the amended Applicant's Exhibit No. 1.

BY MR. MORRIS:

Q Mr. Derrick, just so the record will be absolutely clear, do you subscribe to that rule change that I just moved as a matter of record?

A Yes, I do.

Q Under the rule change which you have outlined and as set forth in Exhibit 1, would any change be made in the current allocation formula for Blanco Mesaverde Gas Pool?

A No. The present formula grants allowables from wells in two parts: 25 percent of the allowable is assigned based on the acreage that the well has or its ratio of the total acreage within the pool, and 75 percent of the allowable is calculated by using the ratio of that well's deliverability to the total pool deliverability and this is corrected, of course, for acreage to the total deliverability of the pool. With the drilling of a second well in a proration unit, there would be the same allowable factor based on acreage, however, when it comes to deliverability, it would be a matter of adding both wells'

deliverability to get the deliverability to be used in the A-D factor.

Q Would you expand a bit on why the deliverability of the second well should be added to the first in computing the deliverability factor to be plugged into the allocation formula?

A Yes. I think the total deliverability should be considered. For example: Now we have many wells that change deliverability from time to time. Large wells become small wells, and in other instances, we have wells which are worked over and assuming they are successful, the deliverability increases. I really can't see a great deal of difference in adding the deliverability of the second well for proration purposes with affording the deliverability of the well that is worked over. Still, we are considering the total deliverability from the proration unit.

Q Did El Paso consider requesting 160-acre spacing rather than the option of drilling the second well on the existing 320-acre proration units?

A Yes. We gave that full consideration, but we decided against it because this would disturb the equities in the present proration units and many of these proration

units have been in effect over 20 years.

(Whereupon, El Paso's Exhibit No. 2 was marked for identification.)

BY MR. MORRIS:

Q Mr. Derrick, what is El Paso's Exhibit No. 2?

A Exhibit No. 2 is a map of the Blanco Mesaverde Gas Pool in Rio Arriba and San Juan Counties, New Mexico. The green line on there is the limit as set by the New Mexico Oil Conservation Commission, and you will note there is a number of wells on there and these are all of the wells drilled to Mesaverde to 1/1/74.

Q Approximately how many producing wells are within the Blanco Mesaverde Gas Pool in New Mexico?

A As of January 1st, 1974, there were 2055 wells.

Q Mr. Derrick, has a study been made of the presently developed gas reserves in the Blanco Mesaverde Pool?

A Yes. These have been summarized on Exhibit 3.

(Whereupon, El Paso's Exhibit 3 was marked for identification.)

MR. MORRIS: In this regard, if the Commission please, Exhibit 3 is quite a bulky exhibit, being a machine run of various tabulated information in all of the

wells in the pool. We apologize to the Commission and the staff and all the participants in the Hearing. We do not have sufficient copies of this exhibit to make available to everyone, however, we have provided one marked copy to the Commission. Mrs. Rodriguez has two copies which certainly can be made available for inspection and perhaps some distribution if she can get them back.

MRS. RODRIGUEZ: Do you want both sets, Mr. Morris or one set?

MR. PORTER: I think those should be made available at the table here.

MR. MORRIS: We would like to make Exhibit 3 available here at counsel's table.

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. Derrick, with respect to Exhibit No. 3, would you identify this exhibit and explain to the Commission what it shows?

A Yes. This is a schedule listing all of the developed wells in the Blanco Mesaverde Gas Pool and the order in which they are listed is in the order of magnitude of remaining reserves. The first column is El Paso's well

identification number. The second column is well location by unit letter, section, township and range. The third column is the original recoverable reserves by wells. The fourth column is the cumulative production by wells to 1/1/74. The fifth column is the remaining recoverable reserves as of 1/1/74 by wells. The sixth column is a percent of original total pool reserves attributable to the well. The seventh column is the percent of total pool remaining reserves attributable to the well. The eighth column is the estimate of number of years remaining to deplete the well. The total developed original reserves, and this is by totaling Column 3 of this schedule is 8.665 trillion cubic feet. That was Column 3. Now, if we sum up Column 5, the total developed remaining recoverable reserves as of 1/1/74, we get a total of 4.942 trillion cubic feet.

MR. PORTER: What is that figure again?

THE WITNESS: 4.942 trillion cubic feet.

MR. PORTER: That is remaining?

THE WITNESS: Yes, sir, as of 1/1/74.

BY MR. MORRIS:

Q Mr. Derrick, these figures are actually shown on the very last page or the bottom of the exhibit, these

totals that you have been referring to?

A Yes.

Q Now, with respect to these remaining reserves that you just mentioned, 4.9 trillion, are these the remaining reserves that are estimated with regard to the development that has occurred up to this time in this pool?

A Yes, that is correct.

Q This has nothing to do with the recoverable reserves that we would expect as a result of the infill drilling program?

A That's correct. This is just for the present 2055 wells.

Q What is the average wells remaining recoverable reserve as shown or as computed from this exhibit?

A The average wells reserves as of January 1st, 1974 is 2.405 billion cubic feet. That is obtained by dividing the total remaining recoverables of the pool by the total number of wells.

Q Please explain to the Commission what analysis has been made of Exhibit No. 3 and in this regard, I will ask you to refer to what has been marked as El Paso's Exhibit No. 4.

A Yes, sir.

(Whereupon, El Paso's Exhibit No. 4 was marked for identification.)

BY MR. MORRIS:

Q Please proceed, Mr. Derrick.

A Based upon Exhibit 3, I have summarized the reserves into two groups. One group is above average reserves, and as I mentioned there a minute ago, our average reserve from Exhibit 3 is 2.405 billion cubic feet remaining. Also we have a category of below average reserves. If we look on Line 1 there we see on the above average that there is 693 wells with an above average reserve. The remaining reserves for this group is 3.624 trillion cubic feet. That is for the total field. The remaining reserves -- let me back up -- I was right the first time. The remaining reserve under Column C is for the group, the 3.624 trillion for the 693 wells. We come out to Column D and we find the remaining reserve per well is 5.229 billion cubic feet. The above average reserves have a 73 percent of the total field reserves. Then we go on out to Column F for the years to depletion and we find 101 years. These are for the above average wells. For the below average wells, there are 1362 in this group and the total reserve for that group is 1.318 trillion cubic feet. The average

remaining reserve per well is 968 million cubic feet. These below average groups -- or this below average group -- has 27 percent of the total remaining reserves and the years to depletion for the below average group is 40 years.

Q From this study, Mr. Derrick, that has been shown on Exhibit 4, which is the study of information shown on Exhibit 3, what conclusions can be drawn?

A Well, in the first place, it is evident that the below average wells are at a more advanced stage of depletion than the above average wells, and also, the remaining deliverability life or the remaining life of the below average wells are greatly below the above average wells, and as you would suspect, the average pressure for the below average wells is lower than that for the higher or above average wells. It appears to me from looking at this that the high wells, the above average wells are pretty well limited under the present field rules in recovering their reserves. That is comparing the deliverability life between the two.

Q In your opinion, would the rules proposed by El Paso in this case alleviate the problem that you have just referred to?

A Yes, although it will not completely cure the

problem, I think it will certainly assist in curing the problem.

Q Have you prepared a series of exhibits comparing the production and income to be realized, assuming on the one hand the continuation of the present rules and the present state of development, and on the other hand, the approval of El Paso's Application and the infill drilling program?

A Yes. This consists of Exhibits 5 through 9, five exhibits which were prepared to show this.

(Whereupon, El Paso's Exhibits Nos. 5 through 9 were marked for identification.)

BY MR. MORRIS:

Q Mr. Derrick, would you first just outline what is contained in this series of exhibits?

A Yes. These five exhibits consist of an estimate of the production from a current well under existing field rules. That is Exhibit 5. Exhibit 6 is the production from this same well, but under the proposed rules assuming infill development. Exhibit 7 is an estimate of the production and the income for the average infill well under the proposed rules assuming infill development. Exhibit 8 is the estimate of production and income for an average

drill site under the proposed rules assuming infill development. In other words, that would be for the full 320 acres. Exhibit No. 9 is really a comparison for an average drill site under the present rules and under the proposed rules and the increase in net income under the proposed rules, again, assuming infill development.

Q Now, will you go back and treat each of these exhibits individually, pointing out the information shown on each one?

A Yes. This is a 20-year projection of production and income from a current well in the Blanco Mesaverde Gas Pool operating under the present field rules.

Q You are now referring to Exhibit 5?

A Yes, Exhibit 5.

Q All right.

A The first column, Column A is the number of years and we show a projection of 20 years and this is starting 1/1/75. Column B is the annual gas production. Column C is the annual oil production. D is the income after royalty and production tax deductions. Column E is the estimated operating expenses. Column F is the net income. Column G is the net income discounted at 8 percent. You will note there that during the 20-year period, we project

that 1.480 billion cubic feet will be produced. The net income under Column F would be $408,000 and on a discounted basis, would be $245,000. Column 6 is production from this same average well, current well, under the proposed --

Q (Interrupting) Do you mean Exhibit 6?

A Exhibit 6. Exhibit 6 is the projection of the estimated production and income for the current average well under the proposed rules, assuming infill development. Again, the headings are the same as in Column 5, so I won't go through that, but in summarizing the amount of gas produced during the 20-year period, again, this would commence 1/1/75, the gas produced is 1.347 billion cubic feet. The net income would be $368,000 and the net income discounted at 8 percent, $203,000.

Next, turning to Exhibit 7, this is the 20-year projection of production and income for the average infill well under the proposed rules assuming infill development. Again, the headings are the same as in Exhibits 5 and 6. We find that the production for the 20-year period commencing 1/1/75 for this infill well is 2.475 billion cubic feet. The net income under Column F is $1,330,000 and the net income discounted at 8 percent, $777,000. I think it is of interest to note on Line 1 or Year 1,

the income for the first year, the discounted income, is $113,000 and we estimate that the cost of the infill well in the Blanco Mesaverde Gas Pool would be $110,000. So we more than recover the cost of the infill well from the income during the first year's operation.

Q Mr. Derrick, at this point, let me ask: What assumptions have you made here with respect to the price of the gas?

A I have assumed that the price included in the R-389-B or the Order 699 would apply and this would be 43¢ in this year and escalating 1¢ per year after -- well, it started already -- it would be 1¢ per year and would be about 44¢ for 1975 and thereafter. That 44¢ would be on a pressure basis 14.73, whereas, these schedules are all prepared to the New Mexico standard base of 15.025 PSI. We have a 1¢ escalation. There is an adjustment for BTU's and also tax reimbursement.

Q While we are on that point, Mr. Derrick, in your opinion, will those gas prices and the economics as you have shown them here on Exhibit 7 provide sufficient economic incentive for the producers to engage in and afford themselves of the opportunity provided by the infill drilling program?

A Yes. In my opinion, the prices included in 699, if applied, and I feel that they will be, to the new gas wells drilled after January 1st, 1973, that this will be a sufficient incentive to cause a great many of these wells to be drilled. Now, I think we all recognize that the 699 Order and the price included therein is not sufficient to drill in a great many areas, especially in the deeper areas, but I would certainly consider that it would be an adequate incentive to cause development in this field.

Q Would you continue with your explanation of Exhibits 8 and 9?

A Yes. Exhibit 8 is a schedule of production and income for an average drill site under the proposed rules assuming infill development. Again, the headings are the same as for 5 through 7. For the period of 20 years, starting 1/1/75, the annual gas production would be 3.822 billion cubic feet. The net income, $1,705,000, and then the discounted income would be $981,000.

On Exhibit 9, we have a comparison, really, of Exhibits 5 and 8. We have it again for a 20-year period starting 1/1/75. The annual production under present rules is included in Column B. Assuming infill development

and changed rules, we show the annual gas volume in Column C. We have 1.480 billion cubic feet that would be produced by the one well that is there now under the present rules. The production under our proposed rules, assuming infill development, would be 3.821 which is an increase of 2.341 billion cubic feet. The increase in net income is included under Column E. That is $1,298,000 increase and when this is discounted 8 percent, it equals $756,000.

Q Mr. Derrick, referring to Exhibit 10, have you made a forecast and estimate of the increase in production and income on a pool total basis?

(Whereupon, El Paso's Exhibit No. 10 was marked for identification.)

A Yes, Exhibit 10 applies to the total Blanco Mesaverde Gas Pool, whereas, Exhibits 5 through 9 applied to individual proration units.

Q And this would be under the infill drilling program, under the rules proposed by El Paso?

A Yes, we have it both ways. Under the present rules -- and, again, this is a 20-year forecast -- under Column B we have the annual production for the total pool under our present rules, and under Column C we have the

RELATION BETWEEN RATE OF PRODUCTION AND INDICATED GAS IN PLACE

A - Using 7-day average pressures

Slope	Years Covered	Average Rate per well, MMcF	Indicated gas in place, BCF
1	1953-1957	170	3,700
2	1957-1960	123	6,900
3	1961-1964	76	16,300
4	1965-1969	100	10,900
5	1970-1973	110	7,800

B - Using Long Term BU Tests

1	1956-1961	120	8,000
2	1960-1965	84	22,800

C - Using Strat-tests

1	1959-1964	85	22,200
2	1965-1969	100	17,600
3	1969-1973	109	11,400

EPNG Exhibit No. 6

BLANCO MESAVERDE GAS POOL

ESTIMATE OF PRODUCTION AND INCOME FOR THE CURRENT
AVERAGE WELL UNDER PROPOSED RULES ASSUMING INFILL DEVELOPMENT

Gas Volumes in M^2cf at 15.025 psia and 60^o F.

Years	Annual Production Gas, M^2cf	Annual Production Oil, Bbls.	Income After Royalty and Prod. Tax, $ 1/	Operating Expenses, $	Net Income, $	Net Income Discounted at 8%, $
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	110.8	506	28,890	1,680	27,210	26,170
2	101.0	462	26,930	1,680	25,250	22,440
3	92.3	422	24,970	1,680	23,290	19,140
4	84.4	386	23,180	1,680	21,500	16,340
5	82.6	377	23,160	1,680	21,480	15,090
6	79.8	364	22,690	1,680	21,010	13,650
7	76.7	350	22,240	1,680	20,560	12,350
8	73.4	335	21,590	1,680	19,910	11,060
9	70.0	320	20,940	1,680	19,260	9,890
10	66.7	305	20,280	1,680	18,600	8,830
11	63.5	290	19,620	1,680	17,940	7,870
12	60.3	276	18,870	1,680	17,190	6,980
13	57.2	262	18,230	1,680	16,550	6,210
14	54.4	248	17,540	1,680	15,860	5,500
15	51.7	236	16,960	1,680	15,280	4,900
16	49.1	225	16,330	1,680	14,650	4,340
17	46.7	214	15,720	1,680	14,040	3,850
18	44.4	203	15,200	1,680	13,520	3,430
19	42.0	192	14,540	1,680	12,860	3,010
20	39.6	181	13,930	1,680	12,250	2,650
Total for Period	1,346.6	6,154	401,810	33,600	368,210	203,700

1/ Gas price at 25¢/Mcf, escalating 0.5¢/Mcf per year, adjusted for BTU content.
Oil price at $6.29/Bbl.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 5264 Exhibit No. 6
Submitted by El Paso
Hearing Date 7/13/74

EPNG Exhibit No. 7

BLANCO MESAVERDE GAS POOL

ESTIMATE OF PRODUCTION AND INCOME FOR THE AVERAGE INFILL WELL UNDER PROPOSED RULES ASSUMING INFILL DEVELOPMENT

Gas Volumes in M^2cf at 15.025 psia and 60^o F.

Years (a)	Annual Production Gas, M^2cf (b)	Annual Production Oil, Bbls. (c)	Income After Royalty and Prod. Tax, $ 1/ (d)	Operating Expenses, $ (e)	Net Income, $ (f)	Net Income Discounted at 8%, $ (g)
1	248.1	1,134	119,710	1,680	118,030	113,490
2	222.2	1,015	109,350	1,680	107,670	95,720
3	199.6	912	100,330	1,680	98,650	81,080
4	179.8	821	92,130	1,680	90,450	68,730
5	166.2	760	87,080	1,680	85,400	60,000
6	153.7	703	82,040	1,680	80,360	52,200
7	142.4	651	77,360	1,680	75,680	45,450
8	132.0	603	72,990	1,680	71,310	39,600
9	122.4	559	69,000	1,680	67,320	34,560
10	113.7	520	65,400	1,680	63,720	30,240
11	106.3	486	62,190	1,680	60,510	26,550
12	98.9	452	58,730	1,680	57,050	23,150
13	92.1	421	55,670	1,680	53,990	20,250
14	85.9	393	52,780	1,680	51,100	17,720
15	80.3	367	50,250	1,680	48,570	15,580
16	75.2	344	47,780	1,680	46,100	13,670
17	70.5	322	45,480	1,680	43,800	12,000
18	66.2	302	43,320	1,680	41,640	10,550
19	61.9	283	41,200	1,680	39,520	9,260
20	57.9	265	39,170	1,680	37,490	8,120
Total for Period	2,475.3	11,313	1,371,960	33,600	1,338,360	777,920

1/ Gas price at 44.9¢/Mcf, escalating 1¢/Mcf per year, adjusted for BTU content. Oil price at $9.23/Bbl.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 5264 Exhibit No. 7
Submitted by El Paso
Hearing Date 8/13/74

EPNG Exhibit No. 8

BLANCO MESAVERDE GAS POOL

ESTIMATE OF PRODUCTION AND INCOME FOR AN AVERAGE
DRILLSITE UNDER PROPOSED RULES ASSUMING INFILL DEVELOPMENT

Gas Volumes in M^2cf at 15.025 psia and 60^o F.

Years (a)	Annual Production Gas, M2cf (b)	Annual Production Oil, Bbls. (c)	Income After Royalty and Prod. Tax, $ (d)	Operating Expenses, $ (e)	Net Income, $ (f)	Net Income Discounted at 8%, $ (g)
1	358.9	1,640	148,600	3,360	145,240	139,660
2	323.2	1,477	136,280	3,360	132,920	118,160
3	291.9	1,334	125,300	3,360	121,940	100,220
4	264.2	1,207	115,310	3,360	111,950	85,070
5	248.8	1,137	110,240	3,360	106,880	75,090
6	233.5	1,067	104,730	3,360	101,370	65,850
7	219.1	1,001	99,600	3,360	96,240	57,800
8	205.4	938	94,580	3,360	91,220	50,660
9	192.4	879	89,940	3,360	86,580	44,450
10	180.4	825	85,680	3,360	82,320	39,070
11	169.8	776	81,810	3,360	78,450	34,420
12	159.2	728	77,600	3,360	74,240	30,130
13	149.3	683	73,900	3,360	70,540	26,460
14	140.3	641	70,320	3,360	66,960	23,220
15	132.0	603	67,210	3,360	63,850	20,480
16	124.3	569	64,110	3,360	60,750	18,010
17	117.2	536	61,200	3,360	57,840	15,850
18	110.6	505	58,520	3,360	55,160	13,980
19	103.9	475	55,740	3,360	52,380	12,270
20	97.5	446	53,100	3,360	49,740	10,770
Total for Period	3,821.9	17,467	1,773,770	67,200	1,706,570	981,620

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 5264 Exhibit No. 8
Submitted by El Paso
Hearing Date 8/13/74

EPNG Exhibit No. 9

BLANCO MESAVERDE GAS POOL

ESTIMATE OF PRODUCTION FROM AN AVERAGE DRILLSITE UNDER PRESENT AND PROPOSED RULES AND THE INCREASE IN NET INCOME UNDER PROPOSED RULES ASSUMING INFILL DEVELOPMENT

Gas Volumes in M^2cf at 15.025 psia and 60^o F.

Years (a)	Annual Production: Present Rules (b)	Annual Production: Proposed Rule (c)	Increased Prod. Under Proposed Rules (d)	Increase in Net Income Under Proposed Rules, $ (e)	Net Income Discounted at 8%, $ (f)
1	111.9	358.9	247.0	117,730	113,210
2	107.8	323.2	215.4	105,870	94,120
3	103.3	291.9	188.6	95,650	78,610
4	98.8	264.2	165.4	86,490	65,720
5	94.3	248.8	154.5	82,120	57,700
6	89.7	233.5	143.8	77,530	50,360
7	85.4	219.1	133.7	73,160	43,930
8	81.2	205.4	124.2	69,020	38,330
9	77.1	192.4	115.3	65,220	33,480
10	73.2	180.4	107.2	61,770	29,320
11	69.5	169.8	100.3	58,660	25,750
12	66.1	159.2	93.1	55,240	22,410
13	62.9	149.3	86.4	52,190	19,580
14	59.8	140.3	80.5	49,340	17,110
15	56.9	132.0	75.1	46,850	15,030
16	53.9	124.3	70.4	44,500	13,190
17	51.0	117.2	66.2	42,350	11,610
18	48.3	110.6	62.3	40,310	10,220
19	45.8	103.9	58.1	38,220	8,950
20	43.4	97.5	54.1	36,150	7,830
Total for Period	1,480.3	3,821.9	2,341.6	1,298,370	756,460

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 5264 Exhibit No. 9
Submitted by Ed Nease
Hearing Date 8/13-74

projected annual production under the proposed rules. Under Column B, the total for the period, we would show a little over 3 trillion cubic feet produced during the 20-year period and 3040 billion cubic feet. Under Column C, under "Infill," assuming infill and the proposed rules adoption, we would produce 7.234 trillion cubic feet -- or 7234 billion cubic feet, and I think it is interesting to note there that during the 20th year, that production is almost three times as great under our proposed-rule change as it is under our present rules.

I might add that in making up this exhibit, it was assumed that commencing in the year 1975, that 200 wells per year would be drilled, 200 infill wells, and this would continue until there was an infill well located on each proration unit.

Under Column D, is the increase of production under the proposed rules of 4.193 trillion cubic feet over the 20-year period and then Column E is the increase in gross income under the proposed rules. This is in millions of dollars. So, the total for the 20-year period would be $3,113,000,000.

Q Mr. Derrick, in regard to Exhibit No. 10, what information did you use concerning gas reserves and what

was the source of that information?

A For the infill drilling, under the proposed rules, I used a total reserve for the developed portion of 15 trillion cubic feet in the Blanco Mesaverde Gas Pool and these were developed by Mr. van Everdingen.

Q Will Mr. van Everdingen be testifying following you in this case?

A Yes, he will.

Q You mentioned 15 trillion cubic feet as being your assumption of the recoverable reserves, assuming the development under the infill drilling program. How does that figure compare to the recoverable reserves under the state of present development?

A From Exhibit 3, the original recoverable reserves for the present developed portion of the Blanco Mesaverde Gas Pool comes out rounded off 8.7 trillion cubic feet. Now, if we subtract that from the 15 trillion, we get an increase of 6.3 trillion feet, cubic feet.

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. Derrick, obviously the information you have presented here shows a substantially increased reserves and also substantially increased production over the

20-year period that you have assumed?

A Yes, sir.

Q Can El Paso's facilities in the San Juan Basin handle these volumes of additional gas?

A Yes, in my opinion, they can, at least from that portion dedicated to El Paso.

Q In this regard, would you expand and give us some field for El Paso's present facilities and its capabilities?

A Yes. El Paso presently has facilities capable of handling 1400 billion cubic feet per day of wellhead gas. Now, after shrinkage fuel and field uses, this is reduced to about 1300 million cubic feet which is the amount of gas that could be gotten to our main line. The total royalty gas available to our San Juan system at the present time is about 1150 million cubic feet per day. So, you can see right there we have about 250 million a day additional capacity. Prior to the time that the decline commenced in the San Juan Basin or prior to the time that the amount of gas declined to the point that we couldn't fill our facilities, El Paso was capable of handling 1500 million cubic feet per day on a total wellhead basis. Due to the decline in deliverability, we

shifted some of that compression from main line or from that station which would get gas into the main line to field compression. So, in the event that this project goes ahead, we would plan to move back that compression and make, again, our facilities capable of handling 1500 million cubic feet per day.

Q If this Application is granted, do you foresee that El Paso would be required to reduce its take from wells, from existing wells?

A No. Of course, we do have the present wells declining. This has been happening all the way down the road. We would anticipate that we would be able to handle all the gas that becomes available.

Q What has El Paso done in recent years by way of installing additional compression to lower the pressures in the gathering lines?

A Over a three-year period, commencing in 1969, El Paso installed considerable horsepower in an effort or in order to reduce gathering line pressures. For example, in 1969, we installed 32,000 horsepower at a cost of $13.4 million. In 1970, we installed 9500 horsepower at a cost of $3 million, and in 1971, we installed 43,900 horsepower at a cost of $11,150,000. We accomplished

here a reduction in the gathering line pressures of approximately 300 to 260 psia for the Dakota-Blanco Mesaverde high pressure system, and for the Picture Cliffs, our low pressure system, the pressure declined from approximately 260 psia to 150 psia.

Q Would additional compression be justified at this time?

A No, not in my opinion. Any additional compression would not increase the gas availability appreciably, and in my opinion, it would be a waste of available reservoir energy.

Q Would you expand on your comment that this would represent a waste of available reservoir energy to install additional compression?

A Yes. In the event that this project is not approved, we would anticipate that we would go ahead and reduce the line pressures to take the gathering line pressures on down. Then, in the future if we come along and decide that the infilling program is feasible, then we would be producing the infill wells into a lower gathering line pressure. In other words, we would not be taking advantage of reservoir pressure as it currently exists. We would be wasting -- it would be economic waste

by putting in additional compression now, and also, it is rather expensive, both economically and physically, to use the gas as fuel to operate the compressors. So that gas that is used for fuel is gone. You will never see that, so that is complete waste, but if we have infill drilling now, we can produce the wells into the current gathering system and not have to lower the line pressures.

Q Mr. Derrick, will you discuss the El Paso market demand for gas from the San Juan Basin, and in that discussion, compare the situation that presently exists with that that has existed in the past?

A Yes. Despite the fact that we have been taking all gas that is available to us from the San Juan Basin and our other gas supply sources, we have not been able to meet the needs of our customers. Based on all of our projections of our total gas supply, we are looking at an annual decline of about 8 percent per year which equates to about 300 million cubic feet per day per year, and that is the decline that we are presently experiencing and is one that we anticipate will continue in the indefinite future.

Q Since October of 1972, has El Paso had to curtail

service to its customers on its interstate system?

A Yes, practically every day since October 30th, 1972, we have had to curtail our customers.

Q What do you mean by "curtailment"?

A Curtailment refers to reduction of gas service rendered to our customers. In other words, to the extent that El Paso lacks sufficient available deliverable supply to satisfy its customers' entitlement, and to the extent that those entitlements go unsatisfied, then service to such customers is said to have been curtailed.

Q How does El Paso determine which requirements are to be satisfied and which are not?

A We have some help on that. El Paso is an interstate natural gas company, serving customers in Texas, Oklahoma, New Mexico, Colorado, Utah, Arizona, Nevada and California, and as such, we are regulated by the Federal Power Commission, and that agency has set forth a group of five priorities which lists the order in which we will curtail in the event of gas shortages and these have been listed on the description on Exhibit 11.

(Whereupon, El Paso's Exhibit No. 11 was marked for identification.)

MR. CAMPBELL: Mr. Chairman, while this exhibit

is being distributed, may I raise a question concerning the introduction of evidence, relating to requirements of the Applicant for natural gas from this pool for the purpose of satisfying its customers' demands or testimony relating to requirements and curtailments of deliveries of natural gas, is not material to this Hearing in view of the limited jurisdiction of this Commission to issue any order in this case based only on the prevention of waste and the protection of correlative rights.

MR. KELLAHIN: If the Commission please, I would like to join in Mr. Campbell's objection and call attention of the Commission to the ruling of the New Mexico Supreme Court in the Continental case where it said: "We find no statutory authority vested in the Commission to require the production of a greater percentage of the allowable or to see to it that the gas purchasers can more nearly meet market demand unless such results stem from or are made necessary by the prevention of waste or the protection of correlative rights." We submit that the testimony that has been submitted in this connection is immaterial to this particular proceeding.

MR. PORTER: Mr. Morris?

MR. MORRIS: If the Commission please, I am sure

the Commission is well aware of the Supreme Court ruling in the so-called Jalmat case of Continental Oil Company versus the Oil Conservation Commission. I think all of the participants in this Hearing, certainly including El Paso, are aware of that. I submit to the Commission that the ruling in that case, while emphasizing that the Commission should base its orders upon the prevention of waste and the protection of correlative rights, did not tell the Commission that it had to be blind to the market demands or market requirements upon the purchasers of natural gas. Rather, the Court said that the Commission could not base its decision solely upon such considerations, but if it bases its considerations upon the recognition of its statutory duties of prevention of waste and protection of correlative rights, there is certainly nothing remiss about this Commission also considering the purchasers' market demand and its need for natural gas to satisfy its market whether they be intrastate markets or interstate markets.

We further submit to the Commission that times have changed greatly since the decision in the Jalmat case and we are now faced with a very critical problem of natural gas supply throughout the United States in various

interstate markets, and certainly, we would intend to show by our testimony and exhibits that El Paso is faced with a very critical situation with regard to availability of gas to supply its interstate market. I think it is quite material for the Commission to consider this evidence in this case.

MR. PORTER: Gentlemen, there was an Order issued dated July 6, 1972 in Case 4682 in which the Commission had this finding: "Evidence concerning market demand, curtailment of gas supplies, energy crises and environmental impact will be received by the Commission and considered in its determination to approve or disapprove the Application if the party offering same can show the relevance of such matters to the prevention of waste and the protection of correlative rights."

Now, within that framework, we will consider a discussion of market demand, but in no other. It has to be related to correlative rights and waste.

MR. MORRIS: Mr. Commissioner, we certainly believe that our evidence will meet that criteria, however, I would like to make our position clear on the record. We believe that this Commission should interpret the statutes under which it operates, the State Statutes under

which it operates in such a manner as to avoid a conflict with the pattern of regulation that exists at the Federal level. We have no desire to see this Commission enter into or adopt an attitude. We do not think it is required by the Statutes of the State of New Mexico to adopt an attitude that would run contrary to the requirements of Federal Law and Federal Constitution. We do not believe that the State Conservation Law should be interpreted and applied in such a manner as would be contrary to the -- we submit--the overriding requirements of interstate commerce. Now, I want to make our position clear that we believe there is that potential for conflict, however, within the ruling that has been made by the Commission, we still believe that the evidence that we would submit to this Commission will meet the criteria that you have announced, that is, that it will relate to the protection of correlative rights and the prevention of waste.

MR. CAMPBELL: Mr. Chairman, I, too, would like to have the record clear on the position of Southern Union Production Company. There has been no statement or certainly no showing to this time of exactly how this evidence which is now being elicited may in some fashion be sufficiently related to the prevention of waste and the protection of

correlative rights to comply with the Order that the Commission issued in 1972 if that is to become the ruling here. We would have to pass judgement at such time as we had identified for us this linkage. In the meantime, we wish to object to the receiving into evidence of Exhibit 11 and any other exhibits which are to follow that relate to the filling of market demand by El Paso Natural Gas Company.

With regard to the question of the relationships between F.P.C. positions and those of this or any other State Commission, this is a very critical and sensitive issue, and we agree that this Commission, to the extent it can, be consistent with its statutory obligation should avoid a direct conflict with the Federal position in this matter. On the other hand, we think the Commission should be particularly careful not to allow its judgements and its responsibilities under the statutes of this State and the decisions of the courts of this State to be tort by the rulings of the Federal Power Commission whose responsibilities are considerably different than those of this Commission. But the record should show our objection on a general basis to this testimony unless there is a clear relationship to the prevention of waste and protection

of correlative rights.

(Whereupon, a discussion was held off the record.)

MR. PORTER: Gentlemen, the Commission feels that the objection is well taken and that before proceeding further with any evidence concerning market demand and curtailment and the other matters raised here, it is incumbent upon the counsel for the Applicant to show us as accurately as possible how this testimony will relate to the issues of waste and correlative rights. The Commission will recess the Hearing at this time until 1:15.

(Whereupon, the Hearing was recessed at approximately 11:45 a.m.)

AFTERNOON SESSION 1:15 P.M.

MR. PORTER: The Hearing will come to order, please. Mr. Morris?

MR. MORRIS: Mr. Commissioner, in response to the Commission's invitation to outline the testimony and evidence that El Paso wishes to present with regard to its market demand, we would have two more exhibits, Exhibits 11 and 12. Exhibit 11 will show the priorities of service that have been prescribed by the Federal Power Commission pursuant to which El Paso is required to observe in curtailing its service to its interstate customers. We also have Exhibit 12 which would show gas supply versus requirements projected for the next three years, that is, '74-75, '75-76, '76-77, showing the amounts of gas required to service the peak load requirements upon our system for the various priorities of service that are set forth on Exhibit 11. By this evidence and the explanatory material that Mr. Derrick would add to explain these exhibits, we would hope to show to the Commission that there is a critical supply problem on our interstate system and that the gas volumes that would be generated by the infill drilling program under the proposed rules presented in this case are needed to help fulfill those requirements.

Now, we believe that we already have shown to the Commission evidence -- and I refer specifically to Exhibit 10, and there are other exhibits that show this -- evidence showing what the annual production would be from the Blanco Mesaverde Gas Pool under the proposed rules compared with the present rules. We feel it incumbent upon us to show to the Commission that our market demand is such and our facilities are such that we can handle the amount of production that would be generated under the infill drilling program. Certainly waste would result if we were not proposing something here that would generate the increased volumes if we were unable to take it either by restrictions in our facilities or restrictions in our market demand. We believe our concept of prevention of waste is involved there, and we believe we need to show what our market demand is in order to satisfy that obligation.

Now, concerning correlative rights, certainly, if operators are denied the opportunity to produce the reserves underlying this tract, the additional reserves that Mr. Derrick has already alluded to, being in some of the additional 6.3 trillion cubic feet of gas that we believe will be generated under this program.

If the owners of the tract under which these reserves lie are precluded from drilling and developing these reserves, not only will waste be caused, but their correlative rights will be violated because they will be denied the opportunity that would be afforded under the proposed rules to protect their correlative rights to produce that gas. Likewise, unless El Paso is in a position to purchase the gas that is produced and has the market demand to support its purchase of that gas, correlative rights, likewise, would be violated.

So, we believe, really for essentially the same reasons, that it is incumbent upon us to show that we have the market demand, the ability and willingness to take the gas in order to prevent waste and protect correlative rights.

I would suggest that the Commission allow us to proceed and introduce this evidence and allow Mr. Derrick to explain it and perhaps even allow those who are in opposition to this evidence being presented to the Commission to cross examine Mr. Derrick, before the Commission rules on whether the evidence will be deemed material because I think that is the best way to have the matter fully before the Commission, so that a proper ruling

can be made to go ahead and present it and then the Commission can then determine the materiality.

MR. PORTER: Mr. Campbell?

MR. CAMPBELL: Mr. Chairman, just a brief response to this. This is a rather strained relationship between present demand of customers for gas and the prevention of waste and protection of correlative rights. It seems quite inadequate to us. Almost as strained as suggesting in the Gas Proration Hearing this morning that gas fields in northwest New Mexico have a producing capacity in excess of market. We are in a time when there is no overproduction of natural gas, and it doesn't seem to us that there is really prevention of waste or protection of correlative rights aspect of this case, except the very legitimate one of recovery of some substantial additional reserves as a result of the granting of this Application. Protection of correlative rights has not yet really surfaced in the Hearing which obviously will be a significant part of it. We still object to this testimony and the introduction of these exhibits in this case.

MR. PORTER: We will sustain the objection. Once again, let me call your attention to the fact that the

case will be decided upon the issues of waste and correlative rights. You may move on with the testimony.

MR. MORRIS: At this time, if the Commission please, because we feel that this evidence relating to our market demand on El Paso's interstate system is critical, because we feel that the Commission should consider it in this case, even though the Commission has now ruled that it will not, we would, at this time, wish to make an offer of proof with respect to this matter. We would like to follow the usual procedures that apply in court for making an offer of proof, that is, by asking the witness questions and eliciting answers from him just to show the matter that we deemed material. We have no desire, if the Commission please, to antagonize the Commission or argue unnecessarily with its ruling, but in order to protect our position in this case with regard to this evidence, we must insist upon our rights to make an offer of proof to show the Commission that evidence which we would have shown if the Commission had ruled that the evidence was material. At this time we ask leave of the Commission to make our offer of proof by asking of the witness questions and eliciting answers from him on the record. It would not be a time consuming procedure. We would ask to do so

at this time so that this evidence will appear at the point in this record where we would have otherwise offered it.

MR. PORTER: You may proceed, Mr. Morris.

BY MR. MORRIS:

Q Mr. Derrick, these questions that I will ask of you are asked just as though you were testifying in answer to questions that would be material, however, they are being asked of you by way of an offer of proof in the case.

Please refer to what has been marked as Exhibit No. 11 and explain that exhibit.

A Yes, sir. Exhibit 11 contains the five priorities that were set forth by the Federal Power Commission in El Paso's curtailment case. This lists the priorities in order of importance. Priority 1, of course, residential, small commercial, and it goes on down to Priority 5 which is the large bar, Fuel Uses, and at the time we curtail, we curtail in inverse order. Priority 5 is curtailed first, 4, and on up through 2 and 1.

Q Mr. Derrick, please refer to Exhibit 12 and explain that exhibit.

(Whereupon, El Paso's Exhibit No. 12 was marked for identification.)

A Exhibit 12 is a 3-paged graphical presentation of El Paso's supply and requirements. The requirements coincide with priorities here and coincide with those outlined in Exhibit 11. If we could look at May of 1974 which would be on Page 1, I could explain the way it is set up. The lower shaded area is Priority 1, and say for the Month of May, for one day we would have a demand under Pricrity 1 of about a billion 8 and you can see it declines on down in the low day for Priority 1 during the month of May, 1974 to be approximately 900 million cubic feet. Then on top of that is the Priority 2, and again, it is arranged in descending order from the top, the highest daily requirement, down to the lowest. Then the small white area is Pricrity 4, and then the large gray area above that again is Priority 5.

For example, in the month of May, our supply is approximately 3500 million cubic feet or 3½ billion cubic feet per day. Well, that shows that during a good part of the month, in fact, all of the month we will be curtailing part of our Priority 5. During that month we did not curtail anything lower than Priority 5. I might add too, there about at the 3500 level and extending across from May through October there is a shaded area labeled

"Advance Deliveries to P. G. and E." equal to 25.4 billion feet roughly. So, what we are doing there is delivering gas in the form of advanced sale to Pacific Gas and Electric and we are going to have to call to get that gas back starting in December or whenever we need it in order to supply the Priority 1 and Priority 2 requirements for our east of California customers. The people in California through their own storage programs and other sources will take care of their own Priorities 2, 3, 4 and 5 during the coming year. Now, I might add, too, at the time we were making these deliveries or these advance deliveries to P. G. And E., we are taking away from east of California. In other words, it is Priority 5 gas that is not delivered to California. So, the California companies take their Priority 5 gas and inject it to supply their own needs.

Now, if you will look over to December of 1974, you will see that El Paso is not able to supply its Priority 2 requirements. That is the first time that we have gotten down to the point that we are not going to be able to supply Priority 2. That shows us to be about 6½ billion cubic feet for the 1974-1975 heating season, but we are going to get a sufficient quantity of gas back during the '74-75 heating season when the gas that we sold

to P. G. and E to serve the east of California Priority 2. So, then, I would refer you over to the '75-76 heating season --

Q (Interrupting) Mr. Derrick, before we go over to the next exhibit, would you point out the line that exists, the horizontal line that exists at the 4011 million cubic feet per day across the top of it?

A That is our sales capacity. In other words, if we had gas available from San Juan or any other source, the demand is there and we have the capacity to deliver up to 4011 million cubic feet per day.

Q So, to whatever the available supply does not come up to that sales capacity curtailment existed?

A Yes. You can see that the Priority 9 extends above during portions of the month every month through November. When we get into December, you can see the Priorities 3's and 4's that the total is above the 4011. Then if you turn on over to some of the later graphs, you can see that we are again at 3's, 4's and 5's extending above the capacity of the system.

Q All right. Now, not only are they extending in some cases above the capacity of the system, but as you are pointing out, they are extending above the supply line,

the supply line, again, going back to the '74-75 exhibit starts off at 3500 million a day and then drops consistently and moves across the --

A (Interrupting) Yes. These are average daily-monthly volumes and they are down a little above 3 million a day at the end of April of 1975.

Q So, does this exhibit show that the available supply, absent this infill drilling program, would drop from 3500 million cubic feet per day in May of 1974 on down to approximately 3000 by the end of April?

A Yes. You mentioned infill -- infill or other supplies?

Q Yes.

A Yes.

Q Then that supply line continues to drop on the succeeding page?

A That is correct, yes, sir.

Q Excuse me. Go ahead.

A All right. Referring to the '75-76 heating season which is Page 2 of Exhibit 12, you can see there that we have a deficiency that is written there on the left side of the page, Potential Volume for East of California Load Equations, of 62,000 million cubic feet or 62 billion.

Now, if we had the place to store it, that gas could go to storage. Then we look up above the supply line on the right side and we say, "Need for East of California Load Equation equals 23.6 or .7 billion cubic feet." That's the amount of gas that we need for Priority 1's and Priority 2's for our east of California load during the '74-75 season. You can see in December in 1975, for the first time, our Priority 1 is in danger because it extends above our supply line and therefore, we are going to have to have storage or some other source of gas in order to meet that demand, and we consider the Priority 1's and 2's to be the most important.

I might add the total P-1 and P-2 deficiency for 1975-76 is 64.4 billion cubic feet, however, that includes the P-1 and P-2 in California. Just, again to repeat, for east of California, our deficiency there is 23.7 billion cubic feet.

Then we turn over to Page 3 of this exhibit and the situation becomes progressively worse. During that period, our Priorities 1 and 2 for east of California is 40.7 billion cubic feet. That does not include the California. You can see the requirements are substantially above our supply line. Of course, that is due to two

things: One is our high priority loads have increased some, and also our supply has decreased. So, the combination of the two has provided very critical factors here.

I believe that is all I have to discuss on this.

Q Mr. Derrick, to continue our offer of proof here, if this request were granted, that is, our Application before the Commission were granted, and new wells were drilled, then, may we conclude from this Exhibit that El Paso would have a definite demand, there is a definite market demand on El Paso's system for the additional gas volumes that would be produced under this program?

A Yes, that is right. In taking the difference between our demand and our supply, it is readily apparent that we need a considerable amount of gas.

Q If the additional volume of gas were generated pursuant to this infill drilling program, would El Paso still be in a situation of some curtailment existing on the system?

A Yes. We will be in a curtailment situation indefinitely. I can't see anything on the horizon that will offset our declining supply and meet the total requirements of the Company.

MR. MORRIS: If the Commission please, that would

complete the tender of proof that we would like to make. I would like to go back to what we would think to be an offer of evidence that has not been ruled immaterial by the Commission.

MR. PORTER: You may do so, Mr. Morris.

BY MR. MORRIS:

Q Mr. Derrick, in your opinion, would the rules proposed by El Paso, the rules changes that would permit infill drilling, more adequately prevent waste and protect correlative rights than the present rules that are in effect?

A Yes. Under the proposed rules, each operator would have the opportunity to increase his gas reserves and also his gas deliverability, and in my mind, this would prevent waste and protect correlative rights.

Q In your opinion, Mr. Derrick, what are the principal advantages of the infill drilling program?

A Well, in summing up, I think the big advantage is the increase in gas reserves and availability that will become available pending the approval of this project. Of course, when we get down to the increased gas reserves and increased availability, we are looking at benefits to a great many people. First, we could start with the

consumer. The consumer would have a larger amount of gas during this period of critical gas supply, another recent shortage. Secondly, the consumer could get the gas cheaper because of the fact that the facilities are more fully loaded means that the unit volume costs them less than it would absent that volume of gas. And the producers, of course, will share in this because they will be increasing their gas reserves and availability, and according to the calculations that I have made, this is an economically viable project. So, from an economic standpoint, the producers would benefit. Certainly, El Paso, as a pipeline would benefit, not only as a producer -- well, I don't think we would benefit as a producer much because we are on a cost of service and we wouldn't share in these higher prices that maybe the producers would -- but we would benefit in that we would be able to more fully load our facilities and better serve the needs of our customers. The royalty owners would be a substantial beneficiary. That includes the Federal Government and the State of New Mexico. The State of New Mexico would benefit through increased taxes that would be applied to these increased reserves from which they are produced. So, I think in summing up, there is just a great many benefits to be

derived in just about all segments of both the oil and gas industry, the pipeline industry and consumers and royalty owners would benefit as a result of this proposed project.

Q Mr. Derrick, were Exhibits 1 through 10 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: At this time, Mr. Examiner, we move that El Paso's Exhibits 1 through 10 be received in evidence.

MR. PORTER: If there are no objections, El Paso's exhibits — Mr. Kellahin?

MR. KELLAHIN: I would like to make an objection. If the Commission please, we object to the introduction at this time of Exhibit No. 3, being a study of reserves, computer run. We haven't had an opportunity to examine it, but in addition to that, there has been no basic testimony to support this exhibit. There is no foundation laid for it. I am assuming that they will have a witness who made the reserve study, and if he can tell us how this exhibit was prepared, but at the present time, there is no sufficient foundation laid for the exhibit.

Now, this same objection would probably go to

Exhibit No. 4 which I will have to assume is based solely on No. 3. So, until a foundation has been laid for No. 3, I don't feel that No. 4 is admissible.

Now, we come to the Exhibits 5 through 12, all of which relates to economics or to the El Paso's needs for gas reserves to fill their pipeline. The Commission has ruled that they will not consider this evidence, and we feel that none of those exhibits should be admitted.

MR. PORTER: Are you referring to 5 through 12 or 5 through 11?

MR. KELLAHIN: 5 through 12. No. 12 is directed toward their necessity for gas to meet their market demand and it is not a matter before this Commission.

MR. MORRIS: At this time, if the Commission please, I have only offered 1 through 10. I will get to 11 and 12 in just a moment.

MR. KELLAHIN: We will object, then, to from 1 through 10.

MR. PORTER: Are you objecting to 1 through 10 or to 3 through 10?

MR. KELLAHIN: We are objecting to 3 through 10.

(Whereupon, a discussion was held off the record.)

MR. PORTER: Mr. Kellahin, your objection, as I understand, on Exhibits 3 and 4 were lack of a foundation being laid by the witness. Now, what are your objections on 5 through 10?

MR. KELLAHIN: Exhibits 5 through 9 are comparisons of production and income, which in no way by this witness has been related to the prevention of waste or the protection of correlative rights, which I think, again, comes within the purview of the Commission's ruling earlier in the Hearing. The Exhibit No. 10 is the same thing as to the pool as a whole or an analysis of pool production related, again, to income under their proposed rule, which, again, is no way related to the prevention of waste or the protection of correlative rights.

MR. MORRIS: Mr. Commissioner, perhaps I could help resolve this matter by asking a couple of clarifying questions of the witness which I think he may have already testified to, but if he hasn't, I want to make sure they are on the record.

BY MR. MORRIS:

Q Mr. Derrick, with regard to Exhibit No. 3, I believe at the time we talked about Exhibit 3, I asked you if Exhibit 3 represented a study that had been made with

regard to the presently developed gas reserves in the Blanco Mesaverde Pool, is that correct?

A Yes.

Q Who prepared this study?

A This study -- and by the way, I will point out -- this is a study of individual wells based on pressure performance. It is pressure versus cumulative production for all of the wells which are presently developed. This was prepared in our Reservoir Engineering Department. It is a study we have had continuing for many many years. It is a study that we used in the Federal Power Commission proceedings. So, it is not something that we just sized up for this Hearing. It is something that we maintain on a continual basis.

Q I believe you previously testified that the Reservoir Engineering Department is a function of the Company that is under your direct supervision?

A That's correct, yes.

MR. MORRIS: We submit, Mr. Commissioner, that Exhibit 3, Exhibit 4, all of the exhibits that we have presented here are admissible and certainly should be considered by this Commission. Of course, Mr. Kellahin and all other parties to the case may ask whatever questions

they wish of this witness on cross examination to test his knowledge of the manner in which these exhibits were prepared and the information that they were prepared from. That is a proper matter for cross examination. It does not relate to admissibility.

We would, again, move the introduction of Exhibits 1 through 10.

(Whereupon, a discussion was held off the record.)

MR. PORTER: The Commission will overrule the objection to the admission of Exhibits and the Exhibits will be admitted to the record.

(Whereupon, El Paso's Exhibits Nos. 1 through 10 were offered and admitted into evidence.)

MR. MORRIS: At this time, if the Commission please, we would also move the introduction into evidence of Exhibits 11 and 12 and would tender to the Commission the explanatory testimony of Mr. Derrick that was generated with regard to those exhibits by way of the offer of tender of proof. I offer this as a matter of form, of course, recognizing that the Commission has already ruled on this matter, but we again formally tender this matter for consideration by the Commission as evidence in this case.

MR. PORTER: Mr. Morris, Exhibits 1 through 10 will be admitted. Exhibits 11 and 12 will not be admitted.

MR. MORRIS: If the Commission please, at this time, that's all we have on direct examination of this witness. We are prepared to offer Mr. Derrick at this time for cross examination, or if the Commission should see the merit to the suggestion that we proceed to give the direct examination of Mr. van Everdingen, we would be happy to do that at this time and then make both of these witnesses available, again, in the order of Mr. Derrick and Mr. van Everdingen, for cross examination.

MR. PORTER: In other words, you would offer your entire case and then open the two witnesses for cross examination?

MR. MORRIS: We will be glad to do that if the Commission sees any merit to proceeding in that manner. We are certainly not insisting upon it.

MR. PORTER: Would anyone object to that proceeding?

MR. HINKLE: Yes. I think we ought to go ahead and cross examine each witness while it is fresh in our minds and so forth.

MR. MORRIS: That is certainly fine with us.

MR. BYRD: Mr. Chairman, I hate to disagree with my co-counsel. I was fearful that at one point in this proceeding that Aztec may go one way and Mesa the other, but certainly, the reason that I prefer the other method is that at the conclusion of the direct testimony of the two witnesses, I was going to renew a motion for some additional time, hopeful that the Commission would be vitally aware of the position of Mesa and I think some of the other producers are in, not knowing exactly what our position is going to be. For the life of me, I can't understand why El Paso would object to a few weeks continuance, either in cross examination or evidence of the Intervenors here when it might result in their getting some support rather than opposition. I am faced with the position here where I might ask Mr. Derrick a question that if he answers, it might cause the Commission to want to deny his application, and four weeks from now I might find out I want it granted. So, out of despairness, I feel that the Intervenors here, particularly Mesa, ought to have a continuance before we cross and before we present our case until we find out what the F.P.C. is going to do on the question of 699. Now, if we follow the procedure that

Mr. Morris has suggested, we would have the direct testimony, and there might be some clarifying questions that the parties might want to ask of the two witnesses in preparation or better understanding of the cross examination at a later date, but I think it would be an orderly procedure and it would permit us to find out which way we are going to go.

MR. HINKLE: In view of this statement, I will withdraw our objection.

MR. MORRIS: If the Commission please, I had no intention by suggesting that we present our direct examination of the second witness to afford opposing counsel an opportunity to re-argue their Motion for Continuance. I consider that the Commission has ruled on the Motion for Continuance, and I am making the suggestion here that it is just a practical way of getting on with the case in the most efficient manner, assuming that the Commission is going to adhere to its ruling that it has already made on the Motion for Continuance. If there is any suggestion, as Mr. Byrd has suggested, that he wants to re-argue a matter already moved on by this Commission, I would have to withdraw my offer to proceed in the manner that I suggested. If we go on with our case, we certainly do so with the assumption that the whole case is going —

MR. BYRD: (Interrupting) I didn't mean to imply, Mr. Morris, that this is such a request. I am going to make that request whenever the direct evidence is in and whenever I have to cross examine. It would be a lot more convenient to do it at the conclusion of your entire direct case rather than doing it at the end of Mr. Derrick's testimony.

MR. PORTER: It is my understanding that you are going to make that request, Mr. Byrd, that Mr. Morris would like to proceed with each witness individually, is that correct?

MR. MORRIS: Yes, sir.

MR. BYRD: Then I would have to make my Motion for Continuance at this time for the reasons previously stated.

In view of what has occurred here already and how important the economics is in drilling this second well on this pool, that about 7 of Mr. Derrick's exhibits related to the economics, and in his exhibits he has used the price of 44¢. He is assuming this is going to be the price in Exhibits 7, 8 and 9, and that is what we don't know, and until we know, I can't cross examine him. I just don't know what the position of my client is going to be.

I think it is out of fairness and I think it is due process to require that we have an opportunity, first, to ascertain the most important factor in this case, and that is the price of new gas, what it is going to be.

MR. CAMPBELL: Southern Union Production Company would like to join in what I gather is now a Motion to postpone cross examination or rebuttal testimony in evidence until the parties have had an opportunity to examine the evidence, the exhibits which have been presented here, all of which are predicated upon reserve estimates that I assume another witness is going to present.

Despite the brilliance of the local attorneys, and their long experience in complicated cases before this Commission, I doubt there has been any more important to producers in the San Juan Basin or perhaps the State than this particular case, and the computerized tabulation of presently estimated reserves, though I suppose is available from the Federal Power Commission, has not been available to us to discuss with our witnesses. The computations that have been made in a number of exhibits require intensive and extensive cross examination as to the facts if the record is to be complete. We certainly appreciate the suggestion of Mr. Morris that both witnesses testify

the case-in-chief and give us at least maybe overnight or a lunch hour to review this evidence, but I am not sure that that will be adequate. I realize this has not been a practice of this Commission. It is not unusual in administrative law. The Federal Power Commission, where El Paso does a good deal of business, the parties submit their exhibits to other parties in advance of the hearing in order that cross examination may be adequately prepared. I am not sure this would not be a good procedure for this Commission, but it is not done at this time, and the only way, I believe, in which we can adequately respond, and I presume where some of the Commission's own staff can respond, is to examine this evidence. I am sure the evidence of the other witness is going to be much more complicated and extensive as this because this is all predicated upon reserves, present and future.

So, we join in the Motion.

MR. HINKLE: Aztec would like to join in the Motion.

MR. MORRIS: If the Commission please, I simply would state that we are, of course, opposed to the Motion for Continuance or the Motion to defer cross examination which is just a way of stating the Motion for Continuance.

At the time we proceeded in this case with our direct testimony this morning, we did so in view of the Commission's ruling on the Motion for Continuance with the expectation that the case would proceed on the cross examination and on the presentation of evidence by all parties present to whatever extent they wish to present evidence to this Commission. We feel that it would be prejudicial to El Paso to now change the rules, the Commission having already having ruled on the Motion for Continuance, so we would respectfully request the Commission simply adhere to the previous ruling in this case.

(Whereupon, a discussion was held off the record.)

MR. PORTER: The Commission will overrule the Motion and the witness is available for cross examination.

MR. HENSLEY: Mr. Chairman, on behalf of Aztec, we would like to proceed with cross examination of the witness at this time.

MR. PORTER: All right, sir, you may do so.

CROSS EXAMINATION

BY MR. HENSLEY:

Q Mr. Derrick, I would first like to refer your attention to what you have identified as El Paso's Exhibit

No. 4. Now, as I understood your direct testimony, this exhibit, in effect, summarizes the reserves study which is contained in Exhibit 3 in two separate categories, one of which is delineated "above average," and the second of which is delineated "below average," is that correct?

A Yes.

Q Did your study which preceded the preparation of this exhibit contain an evaluation of the adverse production figures of each of these wells in the two separate categories?

A No, I don't believe they were broken down in this manner before. We have always just looked at the total, and normally, we look at that, of course, which is dedicated to El Paso, although we do from time to time look at the field reserves.

Q But you did not examine your daily deliverability from each of these two separate categories, is that correct?

A I might not have followed. I thought you asked if I had in previous times broken it down in this manner.

Q No, my question was intended to elicit a response concerning whether or not the average production figures from the various wells which are comprised in these two separate categories, were considered in connection with the

preparation of the exhibit?

A We have broken down -- we have taken the average deliverability for each group of wells, and I have the work paper right here that that was the method that we proceeded on.

Q Well, as I understand Exhibit 4, then, out of the 2055 producing wells in the Blanco Mesaverde Pool at this time, 1352, or considerably more than half are in the category of below average wells so far as reserve is concerned?

A So far as reserves, yes.

Q Is it true, Mr. Derrick, that likewise, over half of the wells in the pool have daily deliverability rates less than what you would consider to be the average rate considering all wells in the pool?

A I haven't made a study of that. If you divide them up as to deliverability, it might break each one according to reserves.

Q Let me ask you this: Is it not a fair statement that over half of the wells in the pool have a daily deliverability rate of less than 200,000 cubic feet a day?

A I am sure that is correct.

Q Now, of this group which has been categorized as

the above average group, pursuant to the reserve comparison, including 693 wells according to Exhibit 4, how many of those wells are connected to the El Paso pipeline system?

A I don't know.

Q How many of those wells are owned or operated by El Paso?

A I don't know.

Q Your records do not indicate?

A I could check, but that wouldn't influence my exhibit.

Q No, I didn't indicate that it would. I simply was inquiring as to whether or not the above average wells, most of the above average wells are connected to your system?

A We have some good wells, yes, sir, but I haven't gone through and broken them down as to the connection.

Q Do you have any indications from your work papers of how many of the 693 wells indicated to be above average from a reserve standpoint are connected to Southern Union's system?

A No, I do not.

Q Do you know whether any are?

A I would anticipate that many of them are because

Southern Union has a lot of wells connected, but I couldn't tell you the number. It would be relatively simple, and I am not suggesting that I do it, because I don't plan to, but by going through Exhibit 3 and take each well, anyone that is interested could see what pipeline it is connected to.

Q Now, there are certain areas of this pool, are there not, Mr. Derrick, where the wells have considerable higher deliverability rates than the other portions?

A Yes, sir.

Q The center portion of the field, generally speaking, contains more prolific wells from the standpoint of deliverability?

A I think the west central.

Q Assuming that they are mostly located in the west central portion of the pool, does El Paso own or operate a substantial portion of the wells in that part of the field, or do you know?

A Our pipeline extends pretty well all over the Basin except for the eastern portion, the northeastern portion which the Northwest Pipeline takes. Now, I don't know. I think we would have to get a map and look, rather than me trying to define which township and which section

our lines serve.

Q I think you misinterpreted my question. I will clarify it. I am talking about the wells that El Paso owns or operates, not your pipeline system?

A Yes, normally we are connected to the wells that we own or operate, so obviously, our pipeline system would be in the same area.

Q Do you have considerable operating interest, to your knowledge, in this area where the wells have higher deliverability rates?

A Let's see. We operate, I think, maybe 1100 wells out of the total 2055. We have some good acreage. It is a matter of public record of the wells that El Paso has an interest in, where our pipelines are, which wells are connected to our system. I am not trying to hide anything, but I just don't have all of that information at hand.

Q Can you safely state that your ownership in this central portion of the field contains some of the better wells in the field?

A Yes, we've got some good wells.

Q Is it also true, to the best of your knowledge, Mr. Derrick, that on the outlying fringes of the pool, that the deliverability rates and reserves, I assume

correspondently, are considerably less?

A Yes.

Q That brings me to Exhibit No. 5, actually 5, 6, 7, 8 and 9, that I will be asking you questions about. First of all, with respect to Exhibit No. 5, which deals with the average drill site under the present field rules, my first question is: How did you arrive at a so-called average drill site?

A Well, it is the drill site that presently is drilled, the 2055. This is the average well on that drill site. In other words, this is an average well in the Blanco Mesaverde Field operating under the present field rules.

Q Now, this indicates to me, although I am not a mathematician, that based on 111.9 million in the first year, that averages out at a daily rate of over 300,000 cubic feet, is that right?

A Whatever the mathematics shows.

Q Well, assuming those mathematics are correct, I would like --

A (Interrupting) Divide 365 into the 111.

Q I believe you indicated in your testimony just a few minutes ago that over half the wells in the field

had a daily deliverability rate less than 200,000, is that not correct?

A You asked me to accept that suggestion as correct. I didn't argue with you. I don't know.

Q Well, assuming that that is correct, then more than half the wells in the field cannot qualify for the economics which are reflected in Exhibit 5, is that correct?

A Well, anytime you take an average, you have some below and some above, yes.

Q Is this a weighted average or remaining average or how was that calculated?

A No, I had better check my work papers. An average deliverability based on the back pressure tests — well, based on the 7-day annual test that we conduct here in New Mexico.

Q Now, directing your attention, if I may, to Exhibit No. 7, if I understand this exhibit, this relates to an economic projection for what, again, is classified as an average in-field well, is that correct?

A Yes.

Q Let's assume that there are hypothetically 2000 wells to be drilled on your infill program based on the fact that there are slightly over 2000 at this time. Does

your study indicate how many of the projected number of 2000 new infill wells would fall into categories of deliverability so that this economic projection would be applicable to that study on that particular well?

A Now, this again, is an average location. This would be the average for the total Blanco Mesaverde Gas Pool. There would be many below and some above.

Q What type of an economic situation would an operator be looking at if he were lying on the fringe area of this pool and now producing a well delivering 100,000 cubic feet a day? What kind of economic schedule have you projected for him?

A Well, I haven't projected one for him. Again, I am looking at the average, but we know -- and I think Mr. van Everdingen will testify to this -- in many instances, the wells that are there now are not draining the full 320 acres. In fact, some of them are not draining 160. So, we would be looking on these fringe areas of probably coming in at almost initial conditions. So, the wells were drilled there initially at certainly less income per unit volume produced than we are presently looking at, so I don't think we would be looking at the same economics that you would be looking at for a well that is currently

there. I am sure you would look at that and decide whether you wanted to drill. I am not suggesting for one minute that all 2055 drill sites will be drilled.

Q Are you, though, suggesting that the major portion of the additional reserves of 6.3 trillion cubic feet which I believe you testified to would be in outlying fringe areas where the present spacing units would not efficiently and economically drain 320 acres?

A Again, Mr. van Everdingen will testify to that because he has made a study of that, but I would presume from visiting with him that that is where some of these reserves are, of course.

Q Would it also be true, Mr. Derrick, that the corollary of that proposition would likewise be true, that in the meat of the field where the higher pay sections exist and where permeability and porosity are better, that you would find little if no additional reserves by additional infill wells?

A No, there will be additional reserves. I would again defer that question to him.

Q I notice also that Exhibit No. 7 as previously indicated is based on the initial price of 44.9¢, is that correct?

A Yes, sir.

Q And that was derived, I assume, from Order No. 699?

A Right.

Q Pending 699.

A I don't think it is pending, necessarily. 699 is issued.

Q Yes, sir. I didn't mean to indicate that it was not issued.

Assuming that in response to the Commission's request for clarification of that Order that the new price would not be available for infill drilling, what type of economic study would be indicated, or economic return would be indicated?

A Whatever -- let me clarify this -- are you suggesting that they would knock out the 45¢ or the 44¢ in 699?

Q Well, I am not suggesting it. I am asking what effect that would have on the projection of economics as contained in Exhibit No. 7?

A Well, it depends on the price that is set. Of course, we probably have something else coming up. The F.P.C. has promised to come out with a new price for old gas. We may be looking at a higher price over and above the 44¢ that we are now looking at. So, it is just

whatever assumption you make as to what economics you crank in.

Q Again, directing your attention to this exhibit, Mr. Derrick, this projection indicates an annual production the first year from this average infill well of 248.1 million cubic feet, is that correct?

A Yes.

Q Again, I don't have a calculator here, but you are talking about a delivery rate of over 500,000 cubic feet, are you not, per day?

A Yes, I think it is closer to 700.

Q Okay, 679, my co-counsel Mr. Byrd says.

How many of these infill locations do you estimate could be drilled with an initial deliverability potential of 679,000 cubic feet a day?

A I think the average one can.

Q The average one?

A So, all above average would be more and all below average would be less, keeping in mind that we are tapping some areas where the pressure is higher than it is under the current wells because of lack of drainage.

Q But that, I believe you have already indicated, would exist mostly in the fringe areas of the pool?

A Not necessarily. It will exist there, but it will also exist over in the heart of the field. We know that from our strat tests from new wells that are drilled. When we looked at the current wells that are there and the pressures that are recorded, we are not saying, or certainly, I don't think anyone should say that that is the pressure that exists mid-way between this location and the next location, because that area would be the one that would be drilled under our proposed infill program and the pressure would be considerably higher.

Q These economics, though, as indicated by Exhibit No. 7, necessarily are predicated on a deliverability volume equal to the projections contained in the first column?

A That is exactly right.

Q So, if you drilled a location and if it is a location where those deliverability rates cannot be obtained or sustained, then these projections are inaccurate as to that operation?

A I don't say they are inaccurate. I would say that the location you are speaking of is a below average location. On the other hand, if you go over and drill one that makes a million 2, that is an above average. This is

what we frame as an average.

Q Now, I assume that this exhibit, as is true with Exhibits 5 and 6, all assume constant well cost, operating expenses, do they not?

A Yes. $1580 per well per year. That is $140 a month per well.

Q What has been El Paso's experience in the stability in operating expenses, say, in the last five-year period?

A Well, this is what we are looking at now, and I suspect like the price of gas and the price of drilling and everything, I am sure it has gone up.

Q Are these exhibits designed to indicate in any way how you would propose to allocate production between the present existing well and the proposed infill well?

A . No, I don't propose to allocate gas between the proposed well and the present well. I think each producer would have to take a look at it and see exactly what his allowable is, how much spare producing capacity he has, if any. I don't think he is going to have very much. I think people are a little overly optimistic when they come around to that. And then, he is going to have to look at the deliverability to save the depletion of the

new well as opposed to the other, and then he is going to have to decide how he will divide the production, if he has that choice.

Q If he faces that choice, then the economics would depend upon the deliverability that was assigned to the new well at a higher rate, if that is true?

A I can't see this deliverability assigned to a new well. I mean, it has its deliverability. It has its physical rate of flow, or it is capable of producing at a certain rate. Let's just take, for example, let's say it makes 600 MCF. If the old one makes 300, that is a total of 900. If the allowable only comes up to 700 for the location, then he would have a choice as to how he would allocate or distribute the 700. We don't propose that either well has an allowable. It is in the drill site, the 320-acre proration unit that would carry the allowable. For all purposes, marginal, non-marginal, overproduction, underproduction, all of that would be looked at on the 320 acre basis.

Q All right, sir, if I may, I would like to direct your attention for the moment to Exhibit 10.

Well, pardon me, if I may. Let's go back to Exhibit No. 7 again, if we can. As I read this exhibit as

it is designed to indicate income from an average infill well, your income after royalty and production tax for the first two years -- well, let's just take the net income figure, Column F -- is $225,000, is that correct?

A Are we on Exhibit 7?

Q Yes, sir.

A $225,000?

Q Yes, income the first two years?

A Oh, adding them. Excuse me. Yes.

Q Let's suppose we have a situation, Mr. Derrick, and let's hypothesize that this order will be approved by this Commission and El Paso is in a position with their tubular goods and rigs to jump in and drill a location offset by another operator. And further assume that the offset operator did not have access to either rigs or tubular goods and could not drill for a period of two years. What would be the affect from the standpoint of correlative rights on the offset operator who could not meet the offset obligations because of a tubular goods or rig shortage if El Paso attained an average well and extracted a net income from that well the first two years of $225,000?

A Well, I would like to preface that before I get into it that El Paso is having problems on tubular goods

also. I think that is pretty prevalent throughout the industry.

It would be just the same as if you went into another location and El Paso drilled and for some reason the offset did not, as I see it. The situation here is no different. It is just something that each producer is going to have to decide. He is going to have to decide how much priority he is going to assign to this location. If he is going to drill a well in Oklahoma, if he is going to drill a well in California, if he has a shortage of tubular goods or shortage of money, that is a problem involved. So, it is just a matter of whether or not the operator chooses to drill. If there is some reason he can't drill, he may be at a disadvantage.

Q Well, if you assume that the operator desires to offset what you got as a good well, and he simply could not because of the lack of those materials, then he would, in fact, be drained, would he not?

A Well, again, Mr. van Everdingen will get into that, but there is not as much communication between these wells and locations that some people believe. We, again, get back to our strat test which about a half mile away, the pressure is 300 or 400 pounds above what the pressure

is in the producing well. I don't think you are going to be overly damaged if you go two years without drilling a well.

Q Well, I am having difficulty based on your direct testimony, because if my recollection is correct, you indicated some 200 infill wells per year?

A That was the purpose of setting Exhibit 10. That, I thought, was a reasonable number of wells to drill, 200 a year, in the Blanco Mesaverde Gas Pool under the infill program. Someone else could make a different estimate and come up with something else.

Q Well, even assuming that you could get rigs and tubular goods sufficient to drill that number of wells, you would be looking at, what, 10 years to offset all of the existing locations in the pool?

A It has taken longer than that to drill the Blanco Mesaverde Pool.

Q And isn't it a fact, Mr. Derrick, that if an operator is delayed by several years in offsetting a producing well in this pool, that he definitely would be drained and suffer economic loss?

A We would have to study the individual location and see what the pressure characteristics are. I just

don't think the damage would be nearly as great as you may be indicating. And, again, with the economics being as good as they are, unless he was just in a position of not ever being able to get tubular goods, why would he delay it for so long?

Q In this connection, you testified on direct examination concerning El Paso's present capacity, and if my notes are correct, 1430 cubic feet per day?

A That is total San Juan Basin. That includes fields other than Blanco Mesaverde, yes.

Q And that your present deliverability into those facilities is 1150 million cubic feet, is that correct, or a differential or excess capacity of 250 million per day?

A Yes, that's roughly.

Q How many infill wells, Mr. Derrick, with the initial deliverability rates of a million cubic feet would it take to absorb that excess capacity?

A Well, if you want to keep it simple, we can assume a million, it takes 250 wells, and that would have to be on acreage that is dedicated to El Paso. Then, we would have to offset the decline in other wells in the San Juan Basin area. We've got the situation where the P.C. Dakota and the Mesaverde are all declining, so not only

do we have the 250 million capacity now, we also have a declining supply in other wells.

Q If you drilled 250 wells with an average deliverability of a million cubic feet, you would immediately use up that excess capacity?

A If that number of wells could be drilled more or less instantaneously on El Paso's dedicated acreage, that is correct.

Q Assuming no further compression at your pipeline facility, what would that to dothe line pressure that these wells would have to be delivering into?

A Again, it would depend on the area in which they are drilled how we are able to handle it, but it could raise the pipeline pressure.

Q Would it raise sufficiently that a number of now producing wells would be cut off because they couldn't buck the pressure?

A Well, I don't know without looking at the specific area we are talking about. I don't know -- we are looking now at about 250 pounds, I believe, on our high pressure system, and again, we would have to examine to see if there is any way to reroute the gas or some of it could be turned into low pressure system. It is just a matter -- with the

number of wells we have connected out there, it is just a day to day operation to stay on top of it. I agree, if you go in and turn more gas in, you are going to raise the pressure.

Q And you are going to have a problem, are you not, of permitting operators a facility to market their gas if they jump in and drill a number of infill wells in the first three or four years?

A Well, as I mentioned, we've got a situation where we've got a declining supply, both in the San Juan and other areas, and I am speaking just for El Paso. We have right now 250 million capacity. As I mentioned, we could increase that to 1500 million a day without very much trouble because we had that situation before we diverted some of the compression. Also, we have a line which goes from Plains, Texas to over near Gallup, New Mexico that we call our Permian-San Juan Crossover that has a capacity -- well, it has a supply that is declining. So, we can make whatever arrangements are necessary, given the supply, to get the gas into our system.

Q And you are fairly satisfied that the operators -- well, if the Commission orders this infill drilling program that you propose and the operators meet their offset

obligations that you would have sufficient capacity to take care of that production even though you admit that 250 wells alone at an average deliverability of a million would use up the full excess capacity in the line except for additional compression?

A Again, when you start looking at 250 wells of El Paso, of course, we don't have nearly all the acreage up there, so that would mean that there would be a great many wells drilled under other areas. So, I don't think this is something that can happen overnight.

Q Well, your question causes an interesting inquiry to me. What about the operators whose wells are connected to Southern Union? What situation are they going to be in when they go in and drill a new infill well and can't find a purchaser for the gas?

A My familiarity with Southern Union is only very general and they are going to have a witness, so I am sure he will be able to answer that.

Q Are you sufficiently generally familiar with their situation to either corroborate or not the fact that there is no additional capacity in their line?

A Well, I would suspect that is true because something over the last 20 years, we have been buying

their excess gas.

Q What is an offset operator going to do whose well has to be connected to that system if he can't get it connected? How is his correlative rights going to be protected under this proposed rule?

A Again, from my knowledge -- and I am not trying to preempt Southern Union's testimony -- but they have tied in wells in the past and they have taken the allowables and the excess gas that they had, they sold to El Paso.

Q Are you familiar with the pipeline pressure differential now existing between El Paso and Southern Union?

A No.

Q Do you know whether or not the present Southern Union pressure is higher?

A No, I do not.

Q Again, assuming hypothetically, Mr. Derrick, that this Commission grants this Order and that 300 wells are -- well, I will say 300 to avoid the decline problem that you mentioned -- are drilled by operators in the next year with an average production rate of a million cubic feet and your excess capacity is gone, how are you going to take the additional gas from Southern Union if you don't

have any capacity to take existing production from a new infill well?

A I think you are being overly optimistic on the number of wells which would be drilled in the next year. You just cited me an example of the tubular goods aspect that they might be faced with and they couldn't drill, but then you come along and say, well, what about 300 wells. Well, what about 600 wells? If 600 wells were drilled this year or next year, we couldn't handle it, but I will say this: El Paso is certainly willing to install whatever facilities are necessary, given the supply of gas.

MR. HENSLEY: We pass the witness.

MR. PORTER: Mr. Derrick, I have one question I believe will clarify something. I believe you indicated a while ago that you had current capacity of 2?0 million which you could increase to 1400 million. Now, do you mean that you had an excess capacity of 250 million?

THE WITNESS: Looking at our total capacity, we have 1400 and our supply is about 11?0, so that gives us the 250.

MR. PORTER: We will make the witness available, Mr. Byrd, for cross examination after a short recess.

(Whereupon, a short recess was held.)

MR. PORTER: The Hearing will come to order, please. The Commission will recognize Mr. Byrd.

MR. BYRD: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. BYRD:

Q Mr. Derrick, would you please refer to Exhibit No. 1?

A Yes, sir.

Q And the proposed change in Rule 9-E. Do I understand that the unit allowable would be produced from either or both wells?

A Yes, sir.

Q Now, if the new well would make the total allowable, could you produce it all from the new well and plug the old well?

A Well, I would think that the operator would be reluctant to plug his own well because there may be a time in the not too distant future that he would need that old well to make his allowable. There might be some extenuating circumstances that initially with plugged production that he could make the allowable from the new well, but I just don't think there is going to be too many cases where one well can make the allowable.

Q You are going to leave this up to the operator?

A Yes, sir.

Q How many wells does El Paso operate in this pool?

A 1100 or 1200.

Q You operate some of the wells in which Mesa has an interest?

A I believe we did Pubco, so that is, yes.

Q As a purchaser of gas, wouldn't it be to your advantage to take as much of the allowable out of the old well that you are only paying 24¢ for?

A Mr. Byrd, we don't make any money on gas. Our money is made based on our rate base, our rate of return. Whatever we pay for gas, we hopefully pass that along to the consumer.

Q Do you think the Federal Power Commission would approve rates in which you had an option to take high price or low price gas and you took the high price gas?

A Well, I guess we've had situations in the past where we might have something similar to this, not in the same field, but we pay different prices for gas throughout our system. We try to look at it on things other than price. For example, here, El Paso as operator, we would want to look at it again, as I mentioned to this gentleman,

about the stage of depletion and all. It may well be -- well, I think it will be in most of the areas, that the stage of depletion, of course, on the new infill well is going to be much less depleted, thereby having a higher pressure than the old well. So,I would want to deplete -- with El Paso as operator, I would strongly recommend that we try to produce these in such a manner that we would deplete them at about the same time. So, that would indicate to me that I should produce the new well at a higher rate than I would the old well.

Q Now, in reference to Exhibit 1 again, your proposed Rule 21-F, I presume that you are going to meter the production from the wells individually?

A Yes, sir.

Q Do you have any objection to letting this Commission set the allowable on a unit between the wells?

A We feel that the flexibility is so much greater when you look at it on a 320-acre unit rather than try to set the allowables. This would double their job, assuming all of the wells were drilled. Instead of having 2000 wells on the proration schedule, they would have 4000, but if we go at it that both wells were added together, then we would still only have 2000 proration units.

Q That is real convenience to you as a purchaser and operator of other people's interest, but don't you think in order to really guarantee a producer like Mesa where you are operating the well, that the allowables ought to be assigned to the two separate wells on the unit on a reasonable basis?

A No, our proposal is that the 320-acre drill site would be assigned an allowable and the producer could produce it as he sees fit.

Q And you don't want this Commission telling you what each well's allowable is going to be on that unit?

A No, sir.

Q You do object to that suggestion?

A Yes, sir. I will stick with our proposed rules changes.

Q Now, if the Federal Power Commission would determine that the national area rate is available to new wells on dedicated acreage only if the Commission here found that it was necessary in order to increase deliverability and increase the ultimate recovery and that they would allow the new price only if this Commission set allowables for each well on the unit, would you then go along with it?

A Yes, I would. I would just say this: When I looked at this, as we reviewed 699, as Mr. Morris stated today, we didn't feel that there was any reason at all why the Commission wouldn't allow the price on wells spudded after January 1st, 1973. It just never entered my mind that they meant anything other than what it said.

Q Are you agreeable to renegotiate the contract price up to the national area rate on the new gas wells?

A Well, what we have, Mr. Byrd, is about something over 90 percent of our contracts, we signed an amendment about two years ago, giving the producers an F.P.C. rate clause, so whatever the F.P.C. permits, they can collect up to that.

Q Let's assume that the national area rate wouldn't apply. Would you still renegotiate the contracts to provide that the new well on your unit, the producer would be entitled to at least the minimum of 44¢?

A No. The producer has an area rate clause in the contract, so we say that he can collect whatever he is permitted by the F.P.C. Now, as far as my being stubborn on this rule, if the Commission or F.P.C. should act, or if the New Mexico Oil Conservation Commission should see that it should be the other way, why, we would accept it.

This is just what we are proposing.

Q Wouldn't this take a burden off your back in your rate cases if the new well had an allowable and the old well had an allowable so that you wouldn't be arguing with the Federal Power Commission about any low priced gas or high priced gas during the test period?

A I will admit that is a possibility.

Q Now, I would like to refer you, if I may, to your Exhibits 5 through 9. As I understand, all of these exhibits are predicated on "an average well," is that right?

A Yes.

Q And comparing Exhibits 5 through 9 with Exhibit 4, do you know where your average well would fit? Would it be in the below or above average group on Exhibit 4?

A I think I had that question before and I didn't know.

Q I didn't get the answer.

A I say, I believe I had that question a few minutes ago and I didn't know the answer to it. I don't know where it would fit.

Q Well, I think you did agree that there were almost twice as many below average wells as there are above average wells on Exhibit 4?

A Yes, sir.

Q And you don't know what the average deliverability of your below average wells are?

A No, I would have to do some checking, and I don't think we have it in that form.

Q Let me ask you: You admitted a minute ago on questions previously answered on cross that you did not trend your operating expenses up in this 20-year period?

A No, sir.

Q Did you make any calculations to see what would happen to the economics if you had trended them upward?

A No, as I stated earlier, of course the trend of everything has been up because of inflation and the trend of gas has been upward. Two years ago, we were looking at something like 14¢ in the San Juan Basin and then we got up to 24 and now we are looking at 44 at least for the new wells. So, everything is trending upward.

Q But you didn't consider it important to trend your --

A (Interrupting) No, as I say, I didn't trend the -- other than the 1¢ installation for the new wells, I didn't assume that there would be any other increases in gas prices, nor did I assume that there would be any

increase in operating expenses.

Q But you did trend your increase in gas price up?

A Only what the F.P.C. permitted, the 1¢ escalation. I haven't assumed that they will go back and find that that gas should be 60¢ rather than 43¢ is the point I was trying to make.

Q On your old wells, you trended the income from the old wells up for the half cent per year increase which is permissible under the Rocky Mountain area rate?

A Yes.

Q Is that permissible under the existing Rocky Mountain area rate?

A I believe it is, yes. That is my recollection.

Q Now, referring to Exhibit 7, I am not sure that I understand how you got the 44.9¢.

A Well, keep in mind, this exhibit commences the year one with 1975. The prices escalate in 1975 to 44¢. Now, there is a difference in pressure base between what the F.P.C. uses and what the New Mexico Oil Conservation Commission uses. With the higher pressure base, you get more cents per MCF.

Q Did you adjust it for the BTU content?

A Yes, sir.

Q Did you adjust it for State taxes?

A Yes. We took out the State taxes. It is really a washout on the State taxes. The F.P.C. allows the State taxes to be collected on top of the base price.

Q I understand that the F.P.C. allows that you get a BTU adjustment on top of State taxes?

A I don't know.

Q I hand you Opinion No. 699, issued by the Federal Power Commission and ask you to look at Appendix D. Isn't there an example there of how you figure the price under the Commission's opinion?

A Well, if you get a BTU adjustment on the State taxes, you turn right around and pay it back in taxes, do you not?

Q No, you are just going to pay a percent tax, aren't you, on the price?

A Yes, but if the price -- well, we are looking at something over 1100 BTU's right here, maybe 1140-odd, but tax, as I understand it, is on the total price.

Q Does that exhibit explain to you how you calculate the price under that opinion?

A Yes, sir. This is R-389-B, Appendix D, Sheet 1 of 1, some computations of national effective rates. They

show Line 1, the base national rate as being 42¢, the State production tax, and in this instance, they have used 3.151¢. I am not sure what State this applies to, but it doesn't matter. The subtotal of 45 and then the BTU adjustment is applied on top of that.

Q You didn't do this calculation?

A No, I don't believe I did. What we did, we used a flat 7.05 percent State Tax, and it varies between the counties and the school districts and what have you, so it would be a very small correction.

Q Mr. Derrick, referring to Exhibit 3, I believe you intimated that these are tabulations on individual well bases that your Company has kept for several years?

A Well, what I meant to imply was, going back to about 1963, we made a very thorough study of the pressure decline performance on the Blanco Mesaverde, and since that time, we have updated it and posted new pressures against the cumulative production, and that is basically that study.

Q Now is the other witness going to testify regarding the reserve study?

A The other witness has nothing to do -- this is my study. The other witness is going to testify on the total field or the total developed reserves, 1½ trillion.

He has not looked at this, nor I don't believe he is familiar with it even.

Q This is based on pressure decline versus cumulative production?

A Yes, sir.

Q Do you have the work papers that you used on this?

A No.

Q There is no way to tell from looking at Exhibit 3 which well is connected to El Paso and which well is not?

A No. You would have to check that against the proration schedule, I believe.

Q Exhibit 3 doesn't show any of the current pressures?

A No, that just shows the original reserves, the cumulative production, the remaining reserves, and things of that nature. It is not a pressure-production decline history, by any means.

Q I notice on Pages 61 through Page 67 of Exhibit 3 that you list a lot of wells with no remaining reserves, is that correct?

A That is altogether possible, yes.

Q And some of these wells had no original recoverable reserves?

A Well, if they never went on production, these are theoretically producing wells.

Q I presume that these wells that had original recoverable reserves and had produced them all are wells that have been on production for a number of years?

A I don't -- this would vary.

Q You have no independent knowledge of the date these wells were drilled, any of them on Exhibit 3?

A We certainly have them in our records. I don't personally.

Q You made a statement in answer to a question a while ago, that in your opinion, there wasn't any difference between what would happen to an operator in this field or pool if this Order was approved that couldn't drill and what would have happened to an operator when the field was initially developed. Was that true?

A I said it would be a similar situation in that some might claim that an offset obligation was there and it is something that the producer would have to work out if he wanted to drill.

Q Is it your opinion that this Commission has a legal responsibility to protect correlative rights of an undeveloped lease?

A As I understand, correlative rights is affording the opportunity to recover your portion of the gas based on its ratio to the total field. This is certainly something that would be afforded every producer.

Q But before a well is drilled on a lease, this Commission has no obligation to protect correlative rights, does it?

A As I would see it -- I am not an attorney -- but I would think he would have to be afforded that right.

Q Do you know whether or not the New Mexico Law requires that this Commission is to protect the correlative rights of undeveloped leases?

A No, I don't, but I would --

Q (Interrupting) Would you agree with me that the producer that has drilled his well in accordance with the Commission's rules on 320-acre spacing units has developed his unit?

A Under the present rules, he has a well on 320 acres which is a proration or spacing unit, and under our proposed rules, that operator would have the option to drill a second well if he so decided.

Q But if it is true that you don't have an obligation to protect the correlative rights on an undeveloped

lease, and the operator that has developed his lease under the present rules you do have an obligation to protect the correlative rights, then your statement that the situation is the same isn't true?

A I didn't agree that the Commission doesn't have the obligation to protect the correlative rights in an undeveloped tract. I don't know. It appears to me that they should because the operator would have the right to drill on that tract and thereby protect the correlative rights.

Q Mr. Derrick, has El Paso made any study that you are going to present in this proceeding as to the interference between wells in this pool?

A The next witness will certainly get into that.

Q Now, have you made any study or will there be any evidence presented in this record by El Paso as to what the actual effect would be to a proration unit after 500 new wells were drilled on 500 other units and the remaining units still have one well on it? Have you made any study on what effect it would have on allowables of the units that have not had the second well drilled?

A No. We have proposed certain rules that would apply as far as allowables go. The wells which have been

drilled on the optional location, the second well deliverability would be added to the first well's deliverability. In the instance where the proration units which did not have a second well, it would be restricted to deliverability from the well that is there now.

Q Have you made any test runs or calculations to see what the effect on the allowable of the single-well units would be under your proposal where there has been 500 units drilled with a new well on each unit?

A No, but just off the top of my head, what it looks like to me would happen is many of those wells would become marginal and they would be allowed to produce all the time.

Q But you have made no study as to what the effect is going to be on individual well units in this field if your proposal is adopted?

A No, sir.

Q Don't you think that is important?

A As I say, Mr. Byrd, I would first have to assume which wells are going to be drilled and at what rate. For purposes of Exhibit 10, I assumed that 200 wells per year would be drilled. The way it appears to me, again, and the fact of looking at El Paso's supply and requirements,

we are going to need all the gas that is available, so we will nominate up to that volume. Now, the proration units which did not have a second well would be restricted by virtue of not having as much deliverability as the unit with two wells.

Q So their participation in the field will go down, will it not? Their A-D ratio will go down?

A It very well could.

Q So you could reduce the allowables to the old wells that have not had a second well drilled on the unit through your formula?

A No, I think what would happen is that those wells would become marginal because of their lower deliverability.

Q What happens when they become marginal, Mr. Derrick?

A They are permitted to produce all the time. They are not restricted.

Q Well, they can't produce about the allowable, can they?

A Well, if they are marginal and can't make the allowable, that proves they are a marginal well.

Q But you are telling this Commission that you made no study at all as to the effects of your proposed allowable

formula on the shift of allowables between units within this pool?

A No, I haven't made any study about that.

Q Referring to Exhibit 7, if you would, please, did you calculate, Mr. Derrick, what the economics would be had you used the present Rocky Mountain area rate of 24¢?

A No.

Q I see on this schedule as on the other schedule you used an 8 percent discount. Can El Paso borrow money at 8 percent?

A No, right now the interest rate is higher than that, but I looked at the prime rates over a several year period and it fluctuated so that it was very difficult to come up with a number, so we decided on 8 percent.

Q Well, in this instance, you didn't take the current rate?

A No, I did not.

Q Is this the way you try your rate cases?

A I am not a rate man. I don't know. Again, it is like our cost of gas service, we put in our rate cases what our actual interest rate is.

Q Would you agree with me on Exhibit 7 that if you reduced the 44.9¢ per MCF to 24¢ per MCF, it would

materially reduce the figures shown both in Columns F and G?

A Yes, I would.

Q And you don't whether under those circumstances that it would be economically feasible or not?

A It wouldn't be as economically feasible to drill as many wells. It would still be economically feasible to drill some of the wells.

Q Can you tell the Commission how many wells that will be drilled under your proposed field rules that would be what you have depicted on Exhibit 7, an average well?

A Well, if we are right on the button, I guess half the wells would be above average and half below average.

Q But Exhibit 4 shows there are twice as many below average wells?

A That's right. On a reserve basis, it does show one-third above and two-thirds below.

Q Did you make any calculations as to how far below average a well would have to be before it becomes uneconomic to drill a second one?

A No, that would vary so much between producers, so, I have just taken the average well here.

Q Does the Commission set allowables for average wells, or do they prorate them individually?

A No, normally they prorate individually.

Q But you didn't make any study on individual wells?

A No, except the reserve studies in Exhibit 3.

Q You testified both on direct and on cross already about the capacity of the existing facilities. Is there additional deliverability from the above average wells connected to your system?

A Yes, we have the advantage -- I guess you would say advantage -- of using that gas. This is gas that is over and above the allowables, you are stating?

Q Yes.

A Yes. Due to the balancing periods and all, we can take some of that gas during the winter peaking period to help offset our peak demand, but again, it comes around to having to balance over a period.

Q How often do you have to balance under the present rules?

A I believe you have about six months to go, and with all these proration specialists, I would rather not speculate on it, but we look at it on about a six-month basis.

Q Have you made any calculations as to how much additional gas you can get from those wells if you added compression?

A Yes, we have looked at that, and as I stated in my direct, we have reached the point where we don't feel it is feasible to install anymore compression at this time. As you know, the flow rate is dependent on the difference in the pressure squared between the reservoir, the wellhead and the gathering system. We have reduced our high pressure system in half over a three-year period. It came from about 500 down to 250 or 260. So, we would get very little increase if we went in now and started reducing line pressure, and then we would just have the effect of emptying that compression in the near future.

Q Well, if some of these above average wells can produce in excess of the allowable now, they could certainly produce an even greater volume if you increase the compression you have in your system?

A No, not to any degree, Mr. Byrd.

Q Then it is not the limitation of allowables that is keeping you from producing these above average wells at a greater rate than they are producing?

A Sure, it is the limitation that isimposed on us

by the allowable.

Q Have you raised your nomination?

A We nominate what we need.

Q Have you suggested to the Commission that they might give you more latitude in balancing these wells?

A Well, there was a period of time when we had a -- a long period where we didn't balance, but eventually you have to balance, and you are able to take that gas during the wintertime when you need it the most and then you cut back in the summer period. I think what you are suggesting is eliminating proration.

Q No, I am suggesting, maybe, that they have a 12 or 24-month balancing period, Mr. Derrick. Wouldn't that be a lot easier for you than building the gathering systems with another 2000 wells?

A No, it is just like when you go down and borrow money at the bank. It catches up with you, and we have found that same thing happens when you over-produce a well.

Q One final question, Mr. Derrick: You stated a minute ago on direct, when you were talking about the benefits that were going to be derived from the proposed Order that El Paso, as a producer, would not receive any benefits. Do you mean to imply that you don't get a rate

or return on the money you spend on your own development?

A I didn't mean to imply that we don't -- in fact, we would have a lot more gas with which to better satisfy our needs and keep our facilities loaded, but whatever we invest in the way of rate base, and wells would be a part of that, we earn on that.

Q And you get that whether or not you get the area rate or national area rate on whatever?

A Yes, sir.

Q Do you get it whether or not Mesa got more than 24¢ or less?

A Yes, sir.

Q I believe in your calculations on Exhibit 7, you agreed a minute ago that that would figure out somewhere around in excess of 600 MCF per day, isn't that right?

A Yes, dividing the 248 by 365, I think somebody divided it out a while ago. Maybe you did.

Q Now, do I understand that it is your intention that you, as operator, have the prerogative of determining which well you are going to produce the gas out of, and it is your intention to produce the old well and the new well so that you would deplete the reserves under each so that they would be depleted at the same time?

A Yes, I think that is something that you could shoot at, and the pressure out there in the new infill wells will probably be 200 or 300 pounds greater than the old well, so you would be taking considerably more gas from the new well than you would your old well.

Q Now, if you drilled a new well and it turned out that the reserves were the same as the remaining reserves under the existing well on the unit, you could produce them equally?

A Well, again, I would have to see what my allowable was and see if I could -- maybe the allowable would be such that I would have to produce more from the new well because I would add the deliverability together to come up with my allowable, so if an equal rate of production from the two would not give me my allowable, I would have to produce the new well higher if it had a higher deliverability. I think this is something that producers have to look at on their own and be the judge of.

Q Well, you do agree that there are a lot of producers that have interests in the wells that you operate?

A That's right.

Q And if the new well came in with the same remaining reserves as the old well, and you depleted them over

the same number of years, your economics as shown on Exhibit No. 7 wouldn't apply, would it?

A I think that is right.

Q You have assumed 679.7 MCF per day for an average well?

A For the average infill well.

MR. BYRD: I believe that is all, Mr. Derrick.

MR. PORTER: Governor Campbell, do you have a question?

MR. CAMPBELL: I have a few, Mr. Chairman. I am going to try to avoid duplication here.

CROSS EXAMINATION

BY MR. CAMPBELL:

Q I would like to ask you a few questions concerning El Paso Natural Gas Company's position in the field as related to the position of the other producers. I believe you stated that out of some 2055 wells in the Mesaverde, that as of January 1, 1974, you believed El Paso Natural Gas Company owned about 1100?

A I believe I said they operated about that many.

Q That includes the wells in which you may be operator under a unit or some other arrangement?

A Yes, sir.

Q In any event, it exceeds 50 percent of the wells in the field that are owned or operated by El Paso Natural Gas Company?

A Yes, I believe that is a true statement.

Q In how many wells in the field is El Paso Natural Gas Company connected as a purchaser, approximately?

A I think we are connected to about 1200 wells, however, we are connected to some wells that belong to Northwest Pipeline. We have an exchange or gathering arrangement, so we are in the range of 50-odd percent that is dedicated to El Paso, that we are connected to, that we operate and not all together in the same wells, but overall, that's about right.

Q You made reference in your testimony, I believe you said in all of those wells, that you were operating on a cost of service basis in terms of your rate base, is that correct?

A Well, the way the F.P.C. Order came out was that on October 7th, 1969, all of the acreage the pipeline companies had in the house at that time would be under cost of service. Acreage acquired subsequent to October 7th of '69 would be on the area rate. Now, most all of the acreage we have had in the San Juan goes back behind

October 7th of '69. There might be a tract or two that is beyond that.

Q Would you enlighten me as to what the "cost of service" means in terms of your cost of drilling infill wells. How is that handled in terms of your rate base?

A Well, as I understand it -- and this is certainly not from an accounting standpoint or legal standpoint or anything else -- but as I understand it, El Paso invests in facilities, pipelines pressure stations, treating plants, and included in there are wells that come under the cost of service. So, all of that goes into our rate base and El Paso earns something like maybe 8 percent over the overall rate base and these wells would be included in this.

Q That is whether they are good wells, bad wells or dry holes?

A Yes, sir. Of course, there is one advantage to that. You are protected. On the other hand, if the price of gas goes to 4½ or 5½, you are not allowed to collect that. So, it cuts both ways.

Q Does El Paso Natural Gas Company have a present drilling program in the event this Application is approved?

A No, we don't. We do not.

Q Do you have any estimate of the number of wells that El Paso Natural Gas Company might be prepared to drill in the first year?

A Well, I would certainly encourage them to drill a hundred.

Q The second year?

A I would think a hundred a year would be -- and I was basing that pretty much -- that is the way I came up with my 200. I thought that El Paso would be in the business to drill about 100 wells and we've got about half of the property up there, so I would assume that the others would drill something on that order.

Q Does El Paso Natural Gas Company presently have sufficient tubular material and drilling rigs to accomplish that?

A No, sir.

Q Is there any reason to believe that that situation is going to improve?

A We hope next year that the situation improves. We are behind our schedule this year on drilling, and it is because of, primarily, lack of tubular goods.

Q Doesn't that change the estimates you make on your 20 years here in your Exhibits 5 through 9?

A No, and to go back a minute, one reason that and El Paso were encouraging this Commission to adopt our proposal is to get out an order so that El Paso and others can start planning ahead for our budget for next year, for our tubular goods, make arrangements to get rigs, and until we know this, it is very difficult to make the plans. Now, of course, the main problem, and I would be the first to admit this, is getting the tubular goods, but from talking to our drilling people and our purchasing people, they think it is going to improve next year.

Q Do they believe that considering the situation that you can still drill wells for $110,000?

A Yes, sir, that was the number that I requested from our Drilling Department, and they made a careful study of it and that is the number they came up with.

Q I wonder if El Paso Natural Gas Company would be willing to enter into a contract for turnkey drilling of the Mesaverde wells?

A Well, unfortunately, we don't have any drilling rigs of our own, but apparently this is based on experience, and I don't have any reason to doubt the validity of it.

Q If that figure is low by a substantial amount on present costs, that too would change your estimate of

recovery to some extent, would it not?

A You mean recovery of money?

Q Yes.

A Yes.

Q I would like to refer you to Exhibits No. 4 and No. 10. I may have misunderstood here. Your Exhibit No. 4 indicates and your testimony indicates additional recovery of reserves in the pool of some 5 trillion?

A No, sir, 6.3 trillion.

Q 6.3 trillion?

A Yes, sir.

Q I presume that that would be substantiated by the testimony of the next witness?

A Yes, sir. I came up with an 8.7 trillion which, again, is a summary of Column 3, I guess, in Exhibit 3, and then Mr. van Everdingen is going to substantiate 15 trillion.

Q Well, he has estimated almost twice as much as your figures estimate?

A Well, it is 8.7 compared to 15.

Q Well, let's take the 6.7 remaining recoverable reserves. Is that your figure?

A No, I believe 4. -- well, if you are looking at

Exhibit 4 --

Q (Interrupting) That is the one I am looking at.

A This is purely on the developed side. The remaining reserve is 4.9 trillion.

Q That is on the present wells?

A Yes, sir.

Q Well, let's take that figure, or take the 6.7 trillion remaining reserves that you estimate elsewhere, under your Exhibit 10, you estimate the increased production under the new rules in 20 years to be 4.2 trillion, is that correct?

A Yes, sir.

Q So that you will be producing, under your figures in the next 20 years, considerably in excess of half of the remaining reserves?

A No. I would look at something over 11 trillion.

Q Of remaining reserves?

A Yes. Well, let's see. You are looking at Column C?

Q Yes, on Exhibit 10.

A Yes, you are right. We would be producing more than half.

Q Do you expect the price of gas to increase

consistently in the future as the supply declines and the demand increases?

A Well, that is a most difficult question. I can only judge on what has happened in the last 10 or 12 years and we have seen an increase in the price of gas. Certainly, if the price of other forms of energy goes up, I would anticipate that the price of gas would increase, although I have no assurance.

Q Mr. Derrick, I would like to ask you a few questions about what knowledge you might have of the reservoir characteristics in the Mesaverde Pool. Have you made a study of those yourself?

A We have studied them over the 20 years that I have been with El Paso. I can't say that I have gone out and made a geological study and studied the samples and cores to that extent.

Q Would you say that this field has a greater than average homogeneity or it is heterogeneous?

A I would say it is heterogeneous.

Q Is it substantially so between tracts? Apparently that is your testimony.

A Yes. In visiting with Mr. van Everdingen, he has found through the study of logs and core analysis and things

of that nature that there is quite a bit lensing there, and I don't want to get into his testimony, but that is one of the bases that we would show a substantial increase in reserves as a result of infill drilling.

Q Has El Paso Natural Gas Company just discovered this phenomena?

A No, we have been aware of this, and we can go back to -- I recall the first time we made a showing on infill drilling before the F.P.C. was about 1956.

Q You had a hearing before this Commission in 1951 on the spacing in this pool. Were you with El Paso Natural Gas Company at that time?

A No. I know that El Paso, at the time the spacing came about, El Paso and others felt that one well would adequately drain 320, but I think the performance subsequent to that time over the last 20-odd years have shown that probably that is not a valid estimate.

Q Do you believe that in a pool with admittedly heterogeneous conditions that this one has, and the wide variations between tracts as you have testified, can properly be evaluated on the basis of average wells or average production?

A For purposes here, we are looking at a pool-wide

basis, and if I were going to go out and invest my money as a producer, I certainly wouldn't take the field average well and say, "This is what I am going to find." I would go in and look at the individual wells in the general area and even though they might not give you as good an answer as you would like, it might be the best answer you can come up with.

Q Would you also look at the potential investment opportunities elsewhere?

A Yes, sir.

MR. CAMPBELL: I believe all the questions, appropriate ones, with regard to correlative rights and protection, Mr. Chairman, have been asked, and I will conclude my cross examination.

(Whereupon, a discussion was held off the record.)

MR. PORTER: Does anyone else have a question of the witness? Mr. Kellahin?

MR. KELLAHIN: Just a few. I will be very brief.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Derrick, Exhibit No. 4, I assume, is based on averages taken from your Exhibit No. 3, is that right?

A Yes, sir.

Q Now, when you go to Exhibits 5 through 9, you have basically taken this from that exhibit, or what source? For example, Annual Production for Existing Wells?

A Well, that is based on our present wells, and again, it is based on Exhibit 3.

Q This is average production for all wells in the pool?

A Yes. When we get over to Exhibit 7, which is the infill, we get into something else.

Q That is what I am coming to. What do you get into there?

A Well, we get in there, based on the work that Mr. van Everdingen has done, he estimates that the original recoverable reserves for the developed portion of the field is 15 trillion cubic feet.

Q That's the same figure that you have used as brought out by Mr. Campbell, is that correct?

A Oh, yes. We were speaking of that number. We were talking about remaining or something, but that is the original. In our study for the Exhibit 3, when totaling up all of the wells that are there now, we come up with about 8.665 as the original recoverable reserves for the

developed portion. Now, I have subtracted the rounded off 8.7 from 15 and it showed an increase of 6.3 trillion cubic feet which would result through this infill program.

Q Now, are those increased reserves or is that merely a figure that you feel will be produced in the next 20 years?

A No, let's don't confuse this 20 years. That is an increase in the original recoverable reserves.

Q Where do you show that in any of the exhibits that you have here?

A That exhibit is coming up with the next witness. My exhibit shows 8.7 trillion which was the result of Exhibit 3.

Q Let's stick to this exhibit. When we come to that, we can ask you about that.

A Okay.

Q At the present time, you have confined your projection to 20 years?

A Yes. Just for illustrative purposes here.

Q It could have been projected for 100 years, too?

A This pool is to me below average, and it could be 40 years, yes.

Q So, the figure you are talking about in your

Exhibit No. 9, the increased production under the proposed rules, is merely an increase as a result of additional wells?

A Yes. This is for the individual well. Referring back to Exhibit No. 9, Column B shows the amount of gas that could be produced, that we anticipate would be produced from an average well as it is presently drilled under our present rules, and that shows 1.430 billion cubic feet. Under the drill site of 320 acres that has a second well drilled, we show a total there of 3.821 billion cubic feet.

Q So, you have added to Column B the figures supplied as a result of the reservoir study which is not yet in evidence, is that correct?

A Yes, you are correct.

Q You have no way of supporting that?

A Right. The 15 trillion, and as I have said, it is based on the next witness' work.

Q I ask you the same question with regard to Exhibit 10 and your answer would be the same?

A Exactly, yes, sir.

Q In connection with the operation of your wells, you operate some 1100 wells, as I understand, will you take the gas from the well with the new price in preference

to the well with the old price?

A The way I look at that, as I mentioned to an earlier question, I think -- and, again, there would be exceptions to it, I am sure, maybe not by El Paso, but maybe by others -- but I would like to see the drill site depleted at an even rate. As I stated, as we see it, the pressure in the infill locations, the undrilled locations is in the range of 2 or 3 or 400 pounds greater than it is when you see the well that is there now. So, I think you would have to conclude that you have more reserves under the undrilled tracts, the undrilled 160 than you do under the drilled. So, on that basis, I would recommend producing more gas, assuming the deliverability is there, I would recommend taking more gas from the new location or the new well in order to equalize the rate of depletion or the stage of depletion.

Q Now, you say you expect to find 300 or 400 pounds of pressure?

A I said, 2, 3 or 400.

Q And you have not drilled any wells in this pool, infill wells?

A Well, yes, several years ago we drilled three of what we call "strat tests."

Q What did you find in those wells?

A We have observed the pressures on those, and they have been a matter of record here in the Commission office for a number of years, and we find that the pressures were considerably higher in those wells, and this is one of the tools that Mr. van Everdingen used to come up with his study. He certainly considered these plus other wells that had been drilled, maybe not infill wells, but wells drilled in between producing wells.

Q And he will testify to these?

A Yes, he will.

MR. KELLAHIN: Thank you very much.

MR. PORTER: Mr. Carpenter?

CROSS EXAMINATION

BY MR. CARPENTER:

Q Mr. Derrick, would you refer to your Exhibit 2, please, a map of the pool?

Doesn't your Exhibit 2 show approximately 400 undrilled 320 locations within the pool?

A I see quite a few undrilled sections in there, so if you counted them and there are 400 locations, I would accept that figure as correct.

Q All right. If I understand your testimony,

Mr. Derrick, you testified that the new rate justifies, in your opinion, the drilling of infill wells in this pool, and sir, if that is true, wouldn't that also give incentive to drill the initial well on these 400 unexploited sites?

A Well, that price only came out on June 21st of this year, so I would think a lot of people would be looking at that very thing.

Q Now, if that is true, Mr. Derrick, and we assume your figure of 200 wells a year would be a reasonable figure for development in this area, isn't your Application about two years premature so that we will use up the unused sites first?

A You can't force people to go out and drill these. If they didn't drill them, we wouldn't have the gas.

Q How many of these are controlled by El Paso Natural Gas, Mr. Derrick; do you have any idea?

A No, I do not.

Q Some of them?

A With our vast spread of acreage there, I am sure that some of those are on units that are operated by El Paso.

Q Would El Paso drill the initial well before the double drill?

A I doubt it.

Q You wouldn't. Now, referring to your Exhibits 5 through 10, Mr. Derrick, isn't it fair to state that the figure would not substantially change if year one in Column A was 1977 or 1978, rather than 1975?

A It would just be pushed down the road. The gas availability would be pushed down the road.

MR. CARPENTER: All right. Thank you, sir.

MR. PORTER: Any further questions of Mr. Derrick? Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Derrick, first of all, referring to your Exhibit No. 3, please, the machine turn-out.

A Yes, sir. I am sorry, I don't have a copy of it. We are pretty short.

Q Well, I will read you the figures that I am talking about. You are probably pretty well acquainted with them. They are all on the last page here. You show a total original recoverable reserves for the 2152 wells that you have listed on this exhibit as being 8.7 trillion, correct?

A Yes, sir.

Q Now, there are 2152 wells, I think, although

there isn't a summary of the total number on here. I believe that is so. So, if we take the 2162 wells into the 8.7 trillion, you get an average original reserve of right at 4 billion cubic feet per well. Now, if we take the total cumulative production and divide that by those 2162 wells, we get an average cumulative production of 1.7 billion cubic feet. And if we take the remaining reserves, which is 4.94 trillion and divide that by the 2018 wells on this exhibit which show remaining reserves, we have a remaining reserve,average reserve, of 2.449 billion cubic feet. Do you agree with me so far?

A Well, I see what you did, but I think we get off a little bit because the 8.65 trillion is for these wells that are listed on here. You mentioned something over 2100?

Q Yes, sir. That is the number I counted on here.

A Okay. Well, there is 2055 on the proration schedule now.

Q Well, I counted 86 pages with 25 wells on them and one page with 12 wells and I got 2162.

A Okay, go ahead.

Q Okay. Now, in other words, this pool has been produced for approximately 24 or 25 years, is that correct?

A Yes, sir.

Q And the average well in that 24 or 25-year period has produced 1.7 billion cubic feet.

Now, I refer you to your Exhibit No. 7 in which you show that the average infill well in a 20-year period will produce 2.47 billion cubic feet. Would you explain to me how the average infill well is going to be better than the average well in the pool for the last 20 or so years?

A Are we looking at Exhibit 7, Column B?

Q Yes, sir. Your annual production totals out to be --

A (Interrupting) 2.4.

Q 2.47 or 2.5 over a 20-year period?

A Well, the way I came on this, I took the back pressure curves as we have plotted for all of the wells, the average, and I applied the high pressure which we believe exists in the undrilled locations, and it is something over 800 pounds, and I took that curve, and using it for the deliverability curve, I came out with these numbers.

Q Well, that pressure is not higher than the original pressure in the pool, is it?

A No. The original pressure was in the range of 1100 to 1200 pounds.

Q But you are going to produce more from the average infill well than the average well has produced?

A Yes. Let's remember, too, that there has been some restrictions in the past, certainly by El Paso, and I am sure by Northwest Pipeline and Southern Union. In the 1950's and 1960's when the Dakota was coming in, we were not producing at capacity.

Q It is indicated to me here that the average production of these average wells has been 1.7 billion cubic feet out of an original reserve of 4 billion, so the average well to date has produced 43 percent of its reserves. Now, if we go to Exhibit No. 10, we find that you are projecting for a pool increase that we will have 4.2 trillion cubic feet of new reserves produced, is that correct?

A Yes.

Q And you said that the other witness will show that there is 6.3 trillion cubic feet in additional reserves being produced as a result of the infill drilling?

A Yes.

Q That figures out to be 67 percent. You are going

to produce 67 percent of the reserves in a 20-year period from the infill wells, and yet the other wells in the pool only produced 43 percent of the reserves.

A Well, there are several things that I mentioned. We were restricted, and keeping in mind, too, that all of these wells -- of course, this would be true in Exhibit 10 -- but all of the wells in the San Juan Basin, Blanco Mesaverde Pool have not been producing for 20 years. There were periods in there when we were not taking all of the gas that was available.

Q Well, all of the 2000 wells you are projecting to be drilled at the rate of 200 a year for 20 years won't be producing from the year one, will they?

A That's right.

Q Yet you are going to make 67 percent of the total reserves being produced in a 20-year period.

A What two numbers are you comparing to get 67 percent, Mr. Nutter?

Q You show the increased production in the third column on Exhibit 10?

A Yes, sir.

Q The increased production for the pool, 4.2 trillion cubic feet, is that correct?

A That's right.

Q That is increased production?

A Yes, sir.

Q You stated that the witness will show there are 6.3 trillion cubic feet to be added to the pool reserves?

A To be added, yes, sir. That's on top of the original 8.7. He is going to show that there is 15 trillion original recoverable reserves in the Blanco Mesaverde Gas Pool.

Q I appreciate that. I am assuming that this 6.3 trillion is lying on these "undeveloped 160-acre tracts"?

A Yes, sir, for the most part.

Q And of those 6.3 trillion, you say that you are going to produce 4.2 which is 67 percent, Mr. Derrick?

A Yes, sir. All right.

Q Now, if we take the 43 percent of the reserves which we have already determined the average well has produced from your Exhibit No. 3, and we go to Exhibit No. 5, we find that if we didn't have any infill program, we would produce another 1.48 billion cubic feet from those wells. They have already produced 1.7. So, their total production over a 40-plus year period would be 3.2, and we determined that the average well had a reserve

of 4 billion cubic feet, so, therefore, the old wells over a 40-year period are going to produce only 80 percent of their reserves, but your new wells you talked about are going to produce 67 percent. I can't see how these new wells are going to be such good wells. Would you explain that to me?

A Well, you have given me a pretty big order, and you have thrown a lot of numbers at me and I haven't been able to follow them all. In some instances, the wells that are there now are draining more than 160 acres because they have benefitted somewhat by the offset locations or the other 160. Now, when we come along and drill those other 160's, we reduce slightly -- and I think it is 13 percent -- we reduce the reserves under the present wells because assuming that they have -- and based on some calculations we did -- it appears that they have drained 13 percent of reserves from the offsetting 160. So, when we come in, these offset locations will be depleted roughly 13 percent. As I mentioned, we were looking at something over 800 pounds, and this is effective reservoir pressure. This is what we measured in our strat tests and what appears to us to be the pressure that exists in the offsetting 160. So, we will go in there and drill that

well and this, of course, is assuming producing both of them at 90 percent capacity throughout the period, and these numbers that I have shown here in Exhibit 5 through 9 and carrying on over into Exhibit 10, would be the reserves that would be produced from the present wells, from the infill wells and coming up to Exhibit 9, the difference. There, we are looking at an increase on a per-well basis of 2.3 billion cubic feet.

Now, if I took that 2.3 billion and assumed that every infill location was drilled as of 1/1/75 and multiply that by 2000, that would be approximately 4.6 trillion cubic feet, but if you check over on Exhibit 10, the fact that some of the infill wells, of course, are spaced out -- well, they are all spaced out over 200 per year for 10 years -- that brings us down to a 4.2 trillion increase over that period, and that compares with the 4.6 or 4.7 that you would get if you had them all completed at the same time.

Q In the early dates of the pool, what was the average deliverability for the well that was drilled?

A Well, it varied quite a bit. I can remember when we were -- well, I don't remember what the average was.

Q I believe if you check the records, Mr. Derrick,

you will find the average deliverability in the pool of the new wells was approximately 750,000 cubic feet per day. Now, referring to Exhibit No. 7, this projected first annual rate of production figures out to be 679,000.

A Was that deliverable or was that what we produced?

Q That was calculated deliverability under the deliverability formula. So, actually, you are showing here that the wells are going to produce approximately 90 percent of what the original wells produced which is close. You say there has only been a 13 percent decline in the undrilled 160. If we've got a spacing pattern in the pool, which is after 25 years only producing about -- has only affected the remaining 160 to the tune of 10 percent deliverability or 13 percent pressure, isn't this a case for 160-acre spacing?

A Well, as I mentioned in my direct this morning, we certainly considered whether or not we should apply for 160-acre spacing, but I don't know how you would go about going to 160-acre spacing. You've got the situation there where people or operators have pooled their acreage to come up with the 320-acre proration units. They have put money up to drill a well. They have produced. They have taken the money -- and this applies to both the operators

and royalty owners -- now, how can you come back and say, "All right, we are going to split this between 160-acre tracts." I don't know how you would go about reconstituting the equity that presently exists. That is a problem I would have.

Q You had a rather lengthy discussion with Mr. Byrd over what the protection of correlative rights means, the protection of correlative rights of undrilled tracts and so forth, but now, in your studied opinion, Mr. Derrick, where does this put the royalty owner or the overriding royalty owner if he's got land under a 320-acre tract to offset a 320-acre tract that has two wells on it? Is the tract that has the one well on it a fully developed tract?

A I don't know that answer.

Q Well, if you retain the 320-acre spacing that has a well on it, it is a developed tract as far as the Commission rules are concerned?

A That's right.

Q And it would be up to the royalty owner to show that it wasn't developed?

A Yes, whatever the lease agreement would show.

Q I think we went into this briefly with you.

You assumed that the 43¢ national prices would go into effect or has gone into effect and would be applicable to these wells, correct?

A Yes.

Q And you assumed that the annual escalation would go into effect or was taking effect?

A Yes.

Q You did not assume any increase in operating costs?

A No, sir.

Q You did not assume any increase in drilling cost even though it would take 10 years to fulfill the 2000 well program?

A Yes. Of course drilling costs didn't enter into these numbers on Exhibits 5 through 10. I just made a comment that on the case of Exhibit 7, that to compare the first year annual income, discounted at $113,000 versus $110,000 drilling cost. That is the only comparison I made. The drilling cost does not appear anywhere in these exhibits.

Q Now, the area-wide price order also provides that as old contracts expire, they can be renewed under the new nation-wide price doesn't it?

A Yes.

Q And you haven't taken under consideration that fact. You have used a constant 25¢ MCF with a half-cent escalation per year?

A Well, we have renegotiated our San Juan contracts largely, to a large part of the operators, and we gave them the F.P.C. area rates. Now, if the F.P.C. sticks to their promise of coming out with a new price for old wells, then, this 24¢ or 25¢ would be increased.

Q What about that portion of Order 699 that says that as old contracts expire, they can renegotiate under the new nation-wide price? Isn't that in there also?

A Well, we renegotiated these contracts prior to their expiration date and they have all types of expiration dates. In 1972, I believe it was, we amended our contracts to put F.P.C. area rate clauses and then took out certain other things.

Q Some of these contracts would be eligible to be renegotiated later on?

A It is possible.

MR. NUTTER: I believe that's all. Thank you. No, I am going to ask you one more question.

BY MR. NUTTER:

Q This other witness, on this 6.3 trillion, is this the volumetric calculation of reserves?

A It is based primarily, I believe, on pressure performance. Again, it is 15 trillion, and I would rather he would explain it to you. I don't want to prejudice his testimony.

Q Is this based some on pressure performance and some on volumetric?

A He will explain the whole study, the whole thing.

Q Your Exhibit 3 is based solely on pressure decline?

A Yes, sir.

MR. NUTTER: Thank you.

MR. PORTER: Does anyone else have a question of Mr. Derrick? The witness may be excused.

(Witness dismissed.)

MR. PORTER: Gentlemen, we are going to recess the Hearing until 8:30 tomorrow morning. We may have to move at 10:00 o'clock. The State Land Commissioner has a geothermal lease sale advertised for 10:00, so it depends on how many people show up for that. If he can accommodate the crowd in his conference room, then we can continue to use this room. If not, we will try to make arrangements for one of the legislative rooms or perhaps

Mabry Hall where we used to hold our Hearings.

Right now, the Hearing is recessed until 8:30 tomorrow morning.

(Whereupon, the Hearing was recessed at approximately 4:30 p.m.)

(Whereupon, the Hearing was re-convened the following morning at 8:30 A.M. Commissioners Porter and Trujillo were present.)

MR. PORTER: The Hearing will come to order, please. Mr. Morris, would you call your next witness, please?

MR. MORRIS: I Call Mr. van Everdingen.

(Witness previously sworn.)

ANTONIUS F. VAN EVERDINGEN

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Please state your name and address.

A My name is Antonius F. van Everdingen and I live on 6138 Bandera, Apartment D, Dallas, 75225.

Q Mr. van Everdingen, we're going to sure have to ask you to speak up as loud as you comfortably can so that not only the Commission can hear you but so the audience can hear you as well. What is your occupation, Mr. van Everdingen?

A I am a Senior Vice President of DeGolyer and

MacNaughton, a firm of petroleum consultants and evaluation engineers, and I am particularly charged with anything to do with reservoir work.

Q Will you describe for the Commission in some detail, Mr. van Everdingen, your education, your qualifications, and your experience in the petroleum industry?

A Well, I graduated in 1923 and for a year I shoveled coal as a mining engineer from the Technical University in Delft. For a year almost I had to shovel coal because there was no job. Then I became a hydrologist for the Curacao Petroleum Company which had just started building their now very large refinery on that island. Well, the idea was to find as much water so that we wouldn't have to import it. But the refinery grew so fast that three years after I left the supply was gone and they are now bringing it in by ship. Now, the only reason I bring this up is because from the very first I had to do with fluid flow, and I wish I knew at that time what I do know now when we meet water wells which are simply drained, whatever ground water exists and flows off to the sea. In that stage I met a man that's Chief Engineer from Surabaya. He came out to do similar work for the town of Willemstadt on the island. The only reason I bring

this up is I had a lot of data that I could share. And I met him again after about four years as an exploration engineer in the East Indies, so it was Curacao in '27, then to Europe, off to Indonesia, and then all through Indonesia -- I mean Sumatra, started off Sumatra, in Java -- the last island was Teracao (sic). Still, a very prolific field going on now for Tesoro, I understand; Tesoro Petroleum has it.

Q What time period was this now?

A This was 1927-'31. And there you were on your own. This was a time we had no logs; we had no radio; there was a telephone line strung to the forest, and that was a good thing because the boss could never visit me, it was too far away. If he did, he had to call the intermediate stations, and the intermediate stations had to tell me what I did wrong. In that respect it was pretty good. But the one other thing I had, I was present when we run the first Schlumberger in Java in 1930, and we thought we had it. There was some nice big kinks on those curves, you know, and later coring showed they were, of course, the limestone and the oil was just about ten meters below that.

In '32, in the depression, I was stationed in the Hague.

Q Now, who were you with at that time?

A I am all the time talking about the old Royal Dutch. I mean mama -- or whatever you wish to call it -- of the Shell Oil Company in the States.

I met my friend from Curacao again, and he started reservoir engineering in the Hague office, and I was his assistant for two years. He passed away, but in the meantime I had made a visit with the chief geologist from Esso, it is called, from the Standard of New Jersey, anyhow with the Anglo Persian we were sent out to evaluate the properties of Stan-Cal, Standard of California, had in Arabia on the island of Bahrein in the Persian Sea. We all recommended that we should go in together with them, that was the idea, but some man later said -- that's the way it came back to me -- someone higher up in the Anglo Persian said he would bring all the oil that could be found west of the Gulf of Persia. Now, mind you I think this was 7 '33, there was no oil at all there, there was just one rig going up in Arabia, so we were out, period. My friend and I went, I was sent to the States on loan. After being on loan for two years --

Q (Interrupting) Excuse me, you were on loan to Shell Oil Company?

A On loan to Shell Oil Company.

Q All right.

A I'm still on loan from Shell Oil Company, one of those retired from them in '62. In Shell Oil I was stationed in Houston for almost from the very beginning from about '34, '35 through '56, and after two or three years checking, you know, all the wells that we were supposed to drill were recommended for drilling, to go over the evaluations made for all the properties we wanted to buy because, unfortunately, in '32 somebody had sold out half of Shells' leases in the East Texas Field, and that didn't sit so well, so the man was promptly fired, but you had to buy them back slowly you know, and it's a good education to buy properties when as a young man you have a holy respect for half a million or a couple of million of dollars. It doesn't look like so much now, but at that time it looked like a big investment, and you wanted to be sure that the Company got whatever it paid for. That meant that you had to evaluate recovery efficiencies and the influence of position of leases on the field, the inference of the position of leases on the field on their ultimate production.

Now, that went on through the '40s I must say, but

by that time the Hague was -- as they say in Shell Oil -- they don't talk about the "Royal Dutch," they talk about the Hague. The Hague came in and they had to go out to Venezuela where they were trying to buy out, or did buy out, the overriding royalties of Barber Oil on their leases around the Maracaibo Basin. I had to do the evaluation of East Venezuela where we took an interest from Gulf and there was in those years the question should we or should we not go deeper into Columbia because that was a huge gas field. There was a rim of oil, and it didn't look so good and it still doesn't look so good. So, that gives you an idea as to how many evaluations you had to make over that 20-year span. In addition, we had a more or less a school going where we trained people for sending out in the various divisions, and at the same time we tried to well to understand the reservoir behavior better than we had done so far.

Q Now, Mr. van Everdingen, excuse me for interrupting, but when you say you were training people, you were training people in reservoir engineering, is that right?

A In reservoir engineering. I had to teach them the principles as far as we could determine at that time as to how to evaluate rates of withdrawal and their effect

on the pressure that would follow.

Q Through this time, what was your position with the Reservoir Engineering Section of Shell?

A I have been the Chief Engineer for the Reservoir Section, never anymore, from -- I might say -- from 1934 through '56, and then I followed another six years the economic problems in the main office in New York and then the last three years I went back to the Hague. On my return, I was then past 60. It was the end.

Q When did you retire from Shell?

A I retired from Shell at the end of '60 and that gives me -- and for about a year I didn't do anything, I was just retired. And then I had a lot of friends, most of them I knew very well from the schools they had gone through in Shell, and some of them were picked up by DeGolyer and MacNaughton, you know, so that is the firm I selected to join, and I have been there 10 years.

Q At this juncture, Mr. van Everdingen, I'm sure that the Commission is familiar with the nature of the firm of Degolyer and MacNaughton as a well-known consulting firm, but, for the record, would you briefly state what DeGolyer and MacNaughton is and what type of a firm it is and what you do; what has been your activities with that

firm since you joined?

A Well, DeGolyer and MacNaughton is strictly evaluations and estimates of ultimate recovery for gas and oil and it was that way -- I think that's the way DeGolyer himself set it up. But when I joined them in '63, the end of '63, DeGolyer already had gone, there was only MacNaughton, but they were strictly evaluating, and for any purpose whatsoever, I mean, people needed loans, they went to the bank, we had to evaluate the properties and we underwrite the estimates and the value of money coming in so that the bank would feel secure in giving whatever money was needed for it. But, again, some of them can be done easily but some are not so easily. One of them is what we are going to talk about today here. I mean the normal evaluations of oil and gas properties, when you talk about fluid and the water drive conditions or/and gas drive, these laws are known and by experience and comparing data that we had in the file you get an answer fairly quick. To do it, of course, you have to fall back on the data in the files we have. We have a practically complete file on any well in any amounts of production in the San Juan Basin.

Q Let me ask you here, has DeGolyer and MacNaughton

done reservoir engineering and evaluation work all over the world?

A Oh, yes, as a matter of fact, my big job before this one was -- I spent twice about a month in India near Burma for DeGolyer and MacNaughton -- I evaluated it. I don't know what the other one was. Grace and Standard of New Jersey had a dispute on a big field in Lybia. I was sent out to handle that affair -- not to handle it, but at least evaluate it, you know -- and see what comes out.

Q How large a firm is DeGolyer and MacNaughton at this time approximately?

A Oh, DeGolyer and MacNaughton is right now 60 engineers, and at least that much help we have, and from the very cramped quarters we have for a long time I was surprised how much information we had when it's all put in its proper place in the new building Energy Square One where we not occupy four floors.

Q Has DeGolyer and MacNaughton had an interest in the San Juan Basin since its discovery; by an "interest" I mean have they followed the development and reservoir engineering in the San Juan Basin since the early days of the Basin?

A Let me answer the first part of the question. We have no interest in it in this respect, financially, but we had an interest representing and evaluating. This was done I think as early as in the '50s. Certainly through the '50s and the'60s we have made repeated evaluations of properties, both Mesaverde and Basin Dakota. This was done by other engineers we have represented. I don't know who it was for the FPC and one man who did that work said -- I asked him and I showed him my outcome -- he said, "Don't be surprised; they're used to figures." I remember from my FPC days that the FPC engineers gave six trillion. Now, we said twelve; it might be some more. The predecessor of the Northwest Pipeline, there is twenty-four trillion coming out of that field, so take your choice. Don't be surprised that you are different from anybody else.

Q What has been your primary field of interest during your service with DeGolyer and MacNaughton?

A There has always been only one thing: Pressure build up, what can you learn from it, how it teaches you about recoveries, and now operations with pressure-build-ups studies on tight gas reservoirs, estimates of ultimate production, and specifically estimates of gas in place,

which is an entirely different category as the normal reservoirs where a well is drilled, logged and by relying on logs you have a fair idea how much area you're talking about. By relying on logs and having some definite ideas how you should interpret it, you have no idea how much gasoline is in this field and this was intriguing, sometimes exasperating, but you see what can be established as to the amount of gas in place here. Now, when I did these things we needed to know -- I see from my notes I should tell you a thing -- in the old days when we started we have no idea how rate of production and water invasion, as it is called or water inflow, are related. Now that, today, is done, you might say, quite well. We have established the relations. If you tell us or tell any engineer thickness, permeability, and pressures, he will tell you how much water comes out of the surroundings to fill up whatever causes the pressure drop that you have given him. Now, that is published in '48 -- no '50 I think -- that was published in 1950, it was in 1968. It gave me the Gold Medal of Lucas, the Lucas Medal, you know, what every engineer hopes to get, but there is only one a year. There are 2000 engineers, they don't all get it. Then, in 1953, that was followed by a paper on how efficient can you drain -- no, how good

is my completion method, so there was some system made that allows us to say that your completion is 100-percent, or 90-percent, or 50-percent efficient by again measuring pressures and analyzing whatever data you can get out of it.

Q Mr. van Everdingen, have you also talked and lectured on petroleum reservoir engineering in universities and in what I will just call generally trade schools within the Shell organization?

A The Shell organization, of course, I was in charge for from '46 almost through '52 and then the best assistance fold up and talk, you know; I did more supervising and that was it. Now, after joining DeGolyer, I have once more, in Dallas, I have one year that I gave a series of lectures of all the things you can do with pressure measurements and build-ups, draw-downs, all you can derive from that. And, then, when in Dallas, I cooperated on establishing or in writing that paper D-14 that you get from the API and D-14 gives a mass of data from the best data we could collect out of the oil companies, correlated and gave you relations between permeabilities, sand thickness. This is called -- no, I don't know what the official title is -- it is D-14. It cost a dollar. You can get it from the API office in Dallas.

Q Mr. van Everdingen, have your studies in the field of reservoir engineering served as the basis for text books in this area and for advancing and establishing the state of the art of reservoir engineering as it is known and practiced today?

MR. PORTER: Could he answer that "yes," or "no," please?

MR. VAN EVERDINGEN: You must have peeked at my notes.

A (Continuing) That's given in Kraft and Hawkins. He's the first one who took it over. All the tables that we made for relations with the rate of withdrawal and pressure drop are copies by Kraft and Hawkins. They are all given in Tom Fricks Handbook. They are probably copied in some other books that I don't know of.

Q Mr. van Everdingen, let's turn specifically now to your experience in the San Juan Basin and the Blanco Mesaverde gas pool in particular. Would you outline that experience?

A Well, the purpose was strictly to determine effectiveness and efficiency of existing wells in draining the reservoir. That requires that I had to know amount of

gas in place, and, of course, a fair idea as to the ultimate production of the now existing wells. Now, to do that, to get acquainted with it, I have read, obviously, all the pamphlets or all the publications dealing with it. There is that one brief discussion of the subsurface Cretaceous rocks in the San Juan Basin in the Four Corners Geological Society Guide Book; it's Stan Bosanics' paper. There is a paper by Allen on the Stratigraphic Gas Development in Blanco Mesaverde Pool in San Juan. That's also in that Four Corners Geological Society Book. The reservoir characteristics in the San Juan Basin have been described and published by a Reneau and Harris. Those were two people from Coralat (sic), and obviously they had a heck of a lot of data to draw from. In addition, we got from El Paso, in addition, the long-term build-up curves that were made on wells that were shut-in for sometimes for more than a year. You see, all of which was made here with the special permission of the Commission because the wells were out of circulation and you had to transfer allowables. In addition, I got from El Paso the pressure data on the strat tests. Those were tests drilled to prove that case perforated and fraced and done nothing to you; just use them to measure the pressures at the point

midway between existing wells. And, of course, we had all the data and there are a mass of data on rate of production, the 70 build-ups as yearly reported from the very beginning on all wells.

Q What was the purpose of this study that you were asked to make by and on behalf of El Paso?

A The purpose of the study was to see if the present wells would drain the existing gas in the reservoir, the gas existing in the reservoir efficiently and sufficiently. Out of that study, I can at once say I came to the conclusion that we should at least aim at 15,000 BCF for that reservoir and double spacing or drill a second well on it because the conditions that you meet in the Mesaverde are so complex that frequently there is improper spacing.

Q All right. Now -- thank you -- you got a little bit ahead of me there, but you're right with me here. On the basis of the study that you made, will you state generally what the conclusions were which you reached concerning the feasibility of infill drilling in the Blanco Mesaverde Gas Pool?

A Well, the conclusion obviously is that the present estimate, which I understand from talking to engineers is somewhere between a low figure of 8 and a more liberal

figure of 10, is too low.

Q Now you're talking about recoverable reserves?

A I'm talking about recoverable reserves. It's low, and it's too low because I think there is evidence to indicate we are talking about a field, the Mesaverde and only the Mesaverde, no Basin Dakota, that has something like 30 trillion or 30 thousand BCF of gas in place, and of course nobody can help reading the papers. I thought to myself, "Here is a beautiful occasion to get Project Engineer off the ground when you can only see 10 billion, which is a rounded-off figure for the ultimate production of existing wells and you have 30 --"

Q (Interrupting) I beg your pardon?

A (Continuing) "10 trillion, which is a rounded-off figure for existing wells, and you have 30 trillion in place you should not be satisfied with such a figure."

Q Did you come to any conclusions concerning the ultimate recovery that could be made from the Blanco Mesaverde Gas Pool if the Commission were to allow two wells to a 320-acre drilling site as El Paso proposes in its application in this Case?

A Then I have to say what I have more or less indicated; it is my opinion that this recovery can be increased from

9 -- I think that was El Paso's figure but my figure was also somewhere 9 -- to 15,000 BCF if the second well were drilled on it.

Q All right. The 15,000 BCF is the same, of course, as the 15 trillion figure that we have been talking about and Mr. Derrick referred to yesterday?

A Oh, yes. Sometimes the figures get so big.

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. van Everdingen, you have before you and we have presented to the Commission what has been marked as El Paso's Exhibits 13 and 14. Would you continue with your explanation of the study that you made and refer to these two exhibits?

MR. CAMPBELL: Mr. Chairman, I would like to make an inquiry. Exhibit 13 is clearly an exhibit copies from the document published in 1961 by Hollenshead and Pritchard. I believe that before we can make a judgment on whether we wish to object to this we need to know whether the Witness participated in this work or in some fashion confirmed it or whether his testimony is based on an assumption as to its correctness.

MR. MORRIS: We will accomodate Governor Campbell's request and will clarify that at this time, if the Commission please.

BY MR. MORRIS:

Q Mr. van Everdingen, with regard to Exhibit 13?

A Yes, sir.

Q Please identify that Exhibit.

A Well, it's an exhibit that shows -- it's a copy, as Mr. Campbell said, from a paper by Hollenshead and Pritchard, and I understand I don't know one or two were or both were El Paso men, so I expected this thing to be suspect when this was presented to the assembly you see. So, in order to -- and I agree fully with what is given here and the description and the way this thing is portrayed -- but instead of relying on him I went through the files in our office, copied all tops of Mesaverde on one of our own maps to clarify how far off this thing is when all the new data, all the data that are available are shown on that map. That map we talked about it -- should we hang it now or not? We are going to move I think at 10 o'clock, but it will be here in my brief case. It's in my roll over here this wide and you can see that the picture shown here is exactly what is today the top of the Mesaverde.

Q Mr. van Everdingen, did you then confirm to your satisfaction the accuracy of the map that is depicted on El Paso's Exhibit 13?

A The structures of contour on the map are correct.

Q All right. Would you wish at this time to refer to your large map?

A Yes, if you can do that.

MR. PORTER: Mr. Morris, I am informed we are going to have to move, so I don't believe there would be any point in hanging the large Exhibit, so at this time we will move up to the Capitol Building, Room 336, and continue the hearing there. Since we will return to this building after noon, but we have to vacate it this morning for a land sale. At this time we will recess the hearing and reassemble in Room 336, State Capitol Building.

(Whereupon, a recess was taken, and participants in the Hearing moved to Room 336, Capitol Building.)

MR. PORTER: I regret all this inconvenience, but it was all we could do under the circumstances. However, if these facilities are satisfactory, we will probably just continue on here this afternoon rather than going back over to Morgan Hall.

Mr. Morris.

BY MR. MORRIS:

Q Mr. van Everdingen, before we recessed to make our move, I had referred you to El Paso's Exhibits 13 and 14. I think you had described what Exhibit 13 was and that you had confirmed Exhibit 13 from your own records. Would you please proceed -- well, next I believe it would be in order to identify El Paso Exhibit 14, and if you wish, please make use of the large Exhibit which we have placed upon the wall.

A Exhibit 13 is a photostatic copy of Hollenshead and Pritchard analysis as the shape of the Mesaverde as taken from the views from the presence of an upper layer. It's a green-marker layer he has used for contours. As I said, this might be objectionable because they are El Paso's people, and here is a map, our own map, which we have used to give you the tops of the Mesaverde as we have them in our files from sufficient number of wells to confirm; then the pictures given by the pictures still help. In introducing No. 14, let's go back a moment to 13 again. 13 shows the area of the most prolific wells. This is an important item in this study because it shows, first of all, that it is not on the highest part of the

structure. The entire structure is as of now high on this part, but the sand disappears -- it's lowest on that part --

Q (Interrupting) Excuse me, Mr. van Everdingen, when you say this part and that part, that won't mean much on the record, you'll have --

A (Continuing) Excuse me. It's highest along the south edges of the field and it's lowest in the northern edge of the field, and the sand bodies, which are nothing but the lenses apparently coming from somewhere deposited from some stream coming in here although I'm not, of course, entirely sure. These lenses, having been stacked upon one another, disappear in here -- that is hardly a productive formation -- disappear on the east side and disappear also on the west side, and apparently are thickest and best developed here.

Q Excuse me, Mr. van Everdingen, I think before we go further with this map I would ask you to identify what the map is and what the red numbers show, what the green numbers show, and what some of the other materials on this Exhibit are so that we know what we're talking about as far as this Exhibit is concerned.

A The red numbers are the depth, the distance on

the top of the Mesaverde, just like Hollenshead has given us the distance from the green mark. There are more things: For instance, that green one, and there are other figures. These are figures, the green figures represent the location of those wells on which El Paso has given us, has provided long-term pressure build-ups. There is still a third one, ST 1, 2, and 3. ST 1, 2, and 3 is the location of the three stratas I mentioned before drilled solely for the purpose of measuring pressures not for production. Finally, there are a couple of crosses here which I will refer to in a second.

Q Mr. van Everdingen, for clarification, I'm going to mark this large wall map as El Paso Exhibit 13-A so that we can distinguish it from Exhibit 13 and Exhibit 14 because it is not exactly the same as either one of those. Okay?

A The wells that are the green numbers in here will be discussed later, so will also the two locations of the Schlumberger log indicated by two crosses, and we also discuss the location at a later time.

To give an idea as to how this thing works, you know, you have received a copy of Enclosure 14 which gives you the estimated ultimate production of wells in the field

which has been contoured on the basis of ultimate. So, for instance, there are a couple of lines, outermost line encloses the entire area in which the wells are expected to make 3 billion cubic feet or more, and then go inside there are the 6 billion lines, the 9 billion and are quite a few patches where the ultimate production will exceed 12 billion per well.

Q Just for clarification, Mr. van Everdingen, the red flag on this Exhibit points to the contour line that show the 3, 6, 9, and 12 billion cubic feet of estimated ultimate production.

A Yes.

Q Okay, sir.

A Some red flags on the top disappeared in the process of reproducing. We can put in a few more. There are two or three areas that have not been identified, but you can see it for yourself. The numbers on your map on the bottom of the long-term build-up curves available. The locations of the wells they have been numbered and the red wells, the numbers correspond to the numbers shown on the map. Some holes for strat tests, the same holes for location of Schlumberger logs. Evident, very evident when you come to the outside, there is no sand to produce or

it is so tight it cannot be produced. You are talking about a field. When you look, and I think the easiest one is still number 13, that's sloping toward the south, sloping upward toward the south, still it contains gas obviously. This is tight along this edges, along the edges here and it will also be tight along here, and along the west side and the east side. We have not quite come to Colorado, but it seems logical that also there the sand content differs. We are talking here about the set of formations that have a thickness, a gross thickness of some 700 to 1000 feet, depending on where you are in the field, and in this thickness that is about there is a very rough 125 feet of sand present and there we enter the difficulty. Is it sand that can be produced, is it sand that is so tight it will not produce?

May I introduce the next Exhibit?

Q Yes. Just one thing, now, before we leave No. 14. I want to make sure that it is clear what some of this information is on this Exhibit. The wells that are shown circled in red represent the long-term build-up test?

A Yes, sir.

Q All right. And the wells that have a square red block around them, there being three of them, represent

the strat tests drilled by El Paso?

A Yes, sir.

Q Okay. Now, what do the other numbers represent on this Exhibit that are shown in the center of each connecting sections?

A Those figures represent the average ultimate production, estimated obviously, of all wells in the four sections where the figure appears, so if you read a figure of 10.4, the four sections surrounding it contain, or should contain 8 wells which ultimate production averages 10.4 billion cubic feet per well.

Q All right, and then the legend that is down in the lower left-hand corner of Exhibit 14 refers to the 38 wells upon which the long-term build-up tests were accomplished and you'll refer to them by those numbers later in your testimony, is that correct?

A Well, I refer to them as the long-term build-up tests becsuse I don't go into the detail of each build-up test. I simply take the group as a whole.

Q All right, sir.

A Now, that sand that is spread out in, let us simply say 800 feet of Mesaverde from the Cliff House down to the Point Lookout, is injected in there in a form of

lens. There may be extensive; a lens may cover a couple of square miles; it may be a very small. It may vary in its content and its permeability and in its porosity very appreciably, and to give an indication as to how fast these things can vary I think.

Q Let me ask you a few questions before you get to that Exhibit, Mr. van Everdingen. You might want to take your seat here just a moment. You have expressed the opinion that there is considerable lensing and that there are porosity and permeability variations. What conclusions do you draw from making those two observations with respect to the feasibility of infill drilling in this field?

A Obviously, if you are lensing and if you have variations in permeability in the same lens from one spot to the other, the chances that infill drilling will give you more gas or more of the ultimate are far better than in all the horizons that I know of where such variations are very limited.

Q All right. Now, would you refer to what has been marked as El Paso's Exhibit No. 15?

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. van Everdingen, please refer to Exhibit 15 and tell the Commission what this Exhibit is and how it relates to the conclusions that you have expressed with regard to the nature of this reservoir?

A Exhibit 15 represents two wells whose location is also indicated on No. 14. Its location is indicated on 13-A hanging on the wall, and they are at a distance 5500 feet to Schlumberger logs on which we have colored in red anything that could possibly be gas bearing or sand to be gas bearing and given it the distance is about one mile to indicate how fast these lenses and layers change from one spot to the other, and therefore, as proof that the variations of permeability and porosity that I mentioned before can be expected in that reservoir. Now, these are only two layers of two wells that we have given. Again, two does not make a sufficient group. It would take about a dozen other sets which show the same or similar variations. That set of wells all over the structure at a distance of about a mile shows similar variations in sand content or possible sand content of their Mesaverde.

Q What do these conditions suggest to you in connection with the feasibility of the proposed infill development?

A Logically they should indicate that infill development would have a better than good chance of being successful in extracting more of the gas from this reservoir.

Q Now, does the conclusion you have just expressed concerning the liklihood of increasing the ultimate recovery by the drilling of additional wells in this field conflict with opinion that you have previously held and expressed generally with regard to the feasibility of additional drilling?

A Yes, sir, it does, because in 1945 the Vietti and myself, Vietti, it was a Texas corporation then, and somebody else -- a man I've forgotten -- we published a paper in which we stated that there could not be a relation, there was no provable relation between spacing and ultimate and to the evidence for such for that paper was based on a study of information on the wells along the Gulf Coast, Louisiana, Oklahoma, where the sand conditions are much more favorable than they are here. I'm not going to make an excuse; don't say it is wrong; under those conditions you probably have a very difficult time to prove there is a relation between space and an ultimate. But here, especially in the outlying areas, the areas out of the core of the field, we are talking about permeabilities,

that are 1000 times smaller than you meet in the sand field from Louisiana. We are talking about milidarcies over there we talk darcies and I think we might be talking about tenths of a millidarcy and under those conditions I think one can expect specially because there is so much variation in the deposition that relations should exist.

Q Mr. van Everdingen, I'll ask you to relate to the Commission the various steps of pressure data which you considered and utilized in making your study with regard to this case?

A In passing I have mentioned the sets -- you want me to distribute them now?

Q Okay.

A That would be 16 and 17.

(Whereupon, a discussion was held off the record.)

Q All right. Mr. van Everdingen, Exhibits 16 and 17 have been distributed and also placed before the Commission. Will you identify those Exhibits and also state the various sets of pressure data that you used in your test?

A Well, there are a total of 3 sets of pressure data

and I refer to Exhibit 17 which gives the pertinent information on such data. Column 1 is simply the year in which the data was developed on the closure; Column 2 is the average number of producing wells which is very nearly even equal to the number of wells on which pressure data was established by the rules of the Commission, one per year. Column 3 gives you the average yearly production per well. Column 4 is the average of the 7-day well-head pressures. Now, all these pressures have been compiled from official data. You can just add them up. They appear in the year books, are issued here in Santa Fe and, of course, we have them on file.

Now we come to the three sets of data we have used. From the 7-day well-head pressures, which is the most commonly referred to figure, we arrived at a total fill 7-day average bottomhole pressure after all the rate of the gas column has something to do add, simply addition of data representing the rate of the gas column is added to the well-head pressure. The three strat-test pressures in Column 6 have been measured and arithmatically averaged each year; sometimes there were two or three measuremants per year. They have been averaged. The long-term build-up tests on which I have referred to often,

theirs was a special test made with special permit by El Paso, made and gives indication of what is the actual pressure in the reservoir if it is done scientifically.

Looking at this figure, well you can look at the figure but it's probably simpler to just go to Enclosure 16, and there the figure given on the average bottomhole pressures so the figures given from 5, 6, and 7 have been plotted in addition to the measures, 7-day measures, and in addition to the well's average yearly rate of production. Now, obviously, there is a very large difference between the long-term fully built-up bottomhole pressures and the average 7-day pressures. I think I can make a guess, I mean by merely looking at this, 3 to 400 pounds is a normal figure.

In addition, it turns out that the average bottomhole pressures from the three strat tests are even higher than I had been able to compute it from the long-term built-up test. There is always almost 50 pounds difference and I am merely quoting from Enclosure 7.

Q When you say seven you mean --

A (Interrupting) Enclosure, I beg your pardon, Enclosure 16. Therefore, I perhaps will deviate a little bit and show some of the difficulties that as reservoir

engineer you have in getting proper pressures. I must once more come back to Enclosure 15, you know. This shows a lot of sand present and if I show this much sand to any Schlumberger log and say this is gas-bearing sand, I'm sure he would have a heart attack. You know, we couldn't disagree more. And in my harder parts I don't think it is all producible sand, but even though it is not producible sand in that well we measured at best a distance of 1 or 2 feet around it, who can tell me how this sand will vary if I go fracing a well additions of 100 or 200 feet in the formation. So, I must be open to some averaging, which I cannot do from logs. I mean, if you go from logs and from core data you enter into an unending dispute what should be in, what should not be in. I don't think much if many people can differ with my determinations of pressures, although the selling of long-term build-up ratios has been very difficult and is still going on. It's still not accepted. The long-term build-up pressures are those for which you shut-in a well after producing it at a fairly constant rate and then keep on measuring your pressures as well as you can until you have assembled sufficient data to give you a straight line.

MR. MORRIS: We'll take a few minutes and distribute

Exhibit 18.

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. van Everdingen, El Paso Exhibit 18 is an Exhibit in 8 parts. Would you please identify this Exhibit and tell us what it is?

A Exhibit 18 is given, contains 8 examples of what can be done with long-term build-up tests. There are 8 examples selected out of the 38 listed on Exhibit 14. There is no reason why these others are not shown. It is simply too much paper work. They all give you the idea what can be established and how we do establish pressures as high as about the 7-day measure pressures as we are stating here. Now, this makes it necessary to digress a little bit so out of my school days I'll have to talk loud this way now. In all these graphs on which you have all 8 copies, the Delta T is simply to shut-in time, the time elapsing to close in the wells. The T which you are given here is what has sometimes by engineers been called the Horner time. It is the length of time it would require the well which has produced 2 billion, let us say, was going at here 87,000 per day to produce that 2 million

cumulative at the rate of 87. If the rate is different like it is here, you divide 512 into the cumulative, gives you the Horner time, which is a fair resemblance of the total time that the well has been on production. When you now measure pressure, you do surfacing and go to down surface. It makes no difference; you get something of this type. As soon as you are at a sloping curve, and as soon as you are on the straight-line portions so that the point falls straight line on this type of plot, you know that you can extrapolate to an infinite time, and then most engineers leave me because I have no infinite time to wait for that pressure to be reached. I don't think we need an infinite time. We need a long time because we have first of all we are dealing with gas production and gas is notoriously difficult in pressure work. Gas is so compressible that it does not follow the normal fluid flow problems which we rely on small compressibility. Therefore, you have to wait until you reach higher pressure where the compressibility is sufficiently small for the well to behave like is expressed by the laws of normal fluid flow. These defines, by the way, are standard in all operations, not on gas but Schlumberger gives them to you when he measures pressures. He gives you a curve

that shows you what is the initial pressure in your reservoir. You produce them for a little while, shut them in bottomhole pressure by Schlumberger, and he gives in addition to all the pressure the extrapolation. I mean this is normal way of doing except here because we are talking gas; we are talking about very tight reservoirs we have to wait a long time. We have to wait 399 days, call it 400 days. I don't even know why I wrote 399; it was about 400 days before we entered this thing. Now, here is a well, by the way, looks like a well that has been sufficiently and successfully fraced because this type of curve shows you there must be at least a frac of 100 to 150 feet away from the well into the formation. It is one of the best ways of getting a well to produce.

Q For the record, Mr. van Everdingen, you are referring now to a blow-up of the Exhibit on Test No. 36, which is part of our Exhibit 18?

A Yes, sir. What is shown here, these three you have in your Exhibit just the same.

Q All right. The three you are referring to now, just for the record, is test No. 36, Test No. 14-A and 13-A?

A Yes, 13-A, yes.

Q And they are all part of Exhibit 18? Okay.

A Now, this is a very clean example because it shows a high frac, a large frac into the formation and you can expect good production out of a thing like this. Here you have the first example where we are now seeing a thing that curves over, and in curving over you don't know whether you have seen the end of that curve or not. Should I have given as an extrapolation for my time, infinity? Should I have given this point or should I have flattened my curve? I'm sorry to say when you have shut in a well for an infinite time, the thing that does not exist, then the ratio of these two become one, so you can see the ratio is a little close to one and you only have to extrapolate over this little distance in order to get what has been called in the industry "B-star values" which I think are very excellent guides in work for simple one-layer reservoirs, one homogeneous reservoir. Here we see the effect if two reservoirs are present. The reservoirs are tight, we know that, and if tight reservoirs exist, the slope should be appreciable, but if more than one layer is open in a well and we have produced that well, then the most permeable layer will give off its gas first, the less permeable very slowly, but from the time you start producing, the low-permeable layer increases its share slowly and the

high permeable layer started off like a man running too fast, he can't keep up the pace. Here he uses his share of the production, but the net result is that when you shut the well in like this, the pressure will take a very long time for building up, and may not tell you anything about the characteristics of the reservoir. This phenomenon is not recognized in the industry sufficiently. It's a very difficult phenomenon. There is one publication on it and it is given by Lefkovits, and in the AIE papers of around 1961. Even then that would be a schedule of only the draw-down curve which is not much help in all when you need a build-up curve and I hope there is long enough to get formulation for that build-up curve for them. Given even this part of the information I can tell you a little bit more about thickness and permeability which I cannot do here. At the same time we can say my infinite pressure or pressure at time infinity I have not much range to go by. But, now come to the hydrologist. The hydrologist and the petroleum engineer seem to be two different types of people, you know. One talks in the feet of head and we talk in pounds, and I come home, and I talk in atmospheres, but here we talk PSIs. I'm used to PSIs, but over there no, they want to have head of water. Now, there are heads in

one respect. They have deviations which tell you that if you have a well open in two formations of different permeabilities and also two formations with different heads, the level in that well will be an intermediate fact or between the two. It will neither be the top one, neither be the bottom one, not the highest pressure, not the lowest pressure; it will be an average. If you have produced such a well and shut them in, you don't take anything out of the well, but there is a continuous stream of water going in from one into the other, from one layer into the other. The wellbore is a conduit for transfer and that is the thing which you see here in this field very clearly by curves that come out like this. Here is a beautiful example, that is 13-A, but after being shut-in for 181 days, the pressure now decides to become more horizontal. We never would have guessed that if the pressure curve had been cut off at 35 days or 100 days. Consequently, even pressures have to be used very careful, and in most cases what has been considered fully built-up, may not be fully built-up, and referring to strat tests which we have done nothing to, and still one of the layers present in the strat test is being exploited by some surrounding well its pressure is lower. In another one is not exploited, it will feed into it and

the net result is that even the strat-test pressures that you have shown, which are shown here on Exhibit No. 16, is very probably below the pressure prevailing at that time at that spot. So, when I come up later on the higher miles of gas in place, don't forget, then, please, that we are not talking about 7-day pressures which are today about 500 pounds, as of today the guessing is that this reservoir had at best its pressure reduced from initial 1300 which is a general figure taken to some thousand pounds inside in those formations that have access to wells. How many don't have an access to wells, I do not know.

(Whereupon, a discussion was had off the record.)

BY MR. MORRIS:

Q Mr. van Everdingen, I'll ask you at this point please to identify for the Commission El Paso Exhibits 19 and 20.

A Exhibit No. 19 is in tabular form, gives the production data taken from official records over the years 1953 through 1973. Column 1, productions for average yearly production for well; Column 2 is the production rate the field production rate and BCF. Column 3 is the cumulative field production in billions of cubic feet per

BCF. Therefore, three columns, which is a repeat of the same ones appearing in Enclosure 17, giving there the 7-day pressures, the three strat-test pressures and in Column 6 the long-term build-up pressures. But no engineer will work with just with pressure or pressure drops. They all like -- and we all like I should say -- pressures divided by the gas-deviation factor, or as it is commonly referred to, P over Z values. Therefore, P/Z values for the same three columns 4, 5, and 6 are given now in 7, 8, and 9. Columns 7, 8, and 9 --

Q (Interrupting) Excuse me. Now, we are talking about Exhibit 20. We're talking now about Exhibit 20, which is an exhibit in three parts, is that correct?

A Yes, sir. So in 7, 8, and 9 -- excuse me, it's falling apart -- in three parts and is graphed on Enclosure 20. The first part is the P/Z values from Column 7 plotted for cumulative field productions. P/Z values of Column 8 is plotted by the cumulative production b.o.c. (sic) values of Column 9 is again plotted for cumulative field production. These are the three parts which make up Enclosure 20.

Now, it's just from here on, simple engineering.

You can draw straight lines and tangential lines, as they are called against all the P/Z values and we start off against those on page of Enclosure 20. These straight lines, because they are tangential to the P/Z values measured, they represent something that goes on in the reservoir over that period and represent it quite well. Therefore, they show the rate of production, the rate of pressure drop under the conditions that prevailed prior or say over the years 1953, 4, 5, 6, and 7. I make one excuse at this point. I should perhaps have indicated the position of each yearly point on here, you see. We have only indicated the position of every fifth year, but every point that is given on the graph is a succeeding number.

If I take a straight line and compute how many P/Z values I lose for cumulative production of a thousand BCF, which I simply read on the bottom, I find out that it is 350. Consequently, had the reservoir been produced like it was over those years, it's only showing to contain the initial P/Z values divided by 350, or 3.7, 37 hundred billion cubic feet of gas in place. Now, these figures that have been derived are given in the top, right on top of Enclosure 20, first page, second page, slope number 2,

slope number 3, slope number 4, slope number 5, have all been treated the same way to determine the slope which is the number of P/Z values lost per BCF divide that in two. The P/Z values that you can still lose and add the past production to it and you've got how much gas is in place because I have not taken into account any end effect. I want to have gas in place and not recoverable gas in place.

Q At this point, Mr. van Everdingen, should we make a correction on the tabulation shown on each of the three pages of Exhibit 20 where it shows indicated gas present as it now reads it shows in BCF? Should that be corrected on each of these pages to read TCF, indicating trillion cubic feet?

A You are entirely correct. That is a difficulty I have. Europe writes periods while America writes commas and I am so confused. Once in a while I leave it to the girls, and they don't know either.

MR. CAMPBELL: Mr. Morris, where is that correction?

MR. MORRIS: All right. For the record, I am referring to the little inserted tabulation on each of the pages of Exhibit 20 and on the right-hand side of

that at the top it says "Indicated gas present - BCF." That should be corrected to read "TCF," indicating trillion cubic feet so that it would mean under Example No. 1 there the slope per thousand 350 indicating 3.7 trillion cubic feet in place.

MR. VAN EVERDINGEN: We have discussed that before; can I insert easily commas? But we had 100 Enclosures, three times we didn't insert; we didn't change the periods to semi-colons.

BY MR. MORRIS:

A (Continuing) Now, this Enclosure is very instructive because we are talking about the amount of gas in place. You take out an amount of gas and apparently you're doing something different in the next step, and just by doing something different a lot of gas disappears or increases. You can -- a lot of gas appears or disappears because the extrapolations of these curves don't agree. If the reservoir is contiguous, homogeneous, uniform, the amount of gas produced should be proportional to the number of pressure P/Z units lost, and any deviation of that means something is not the way you think it is. Something is very strongly suggesting your reservoir is not homogeneous.

Now, we have done this on all of our curves you know. The Blanco Mesaverde long-term test only gave me an occasion to draw two lines on it because I'm only covering the period in the late '50s and the middle '60s. The strat test is occasion to draw three types of lines on it you know, and always you find that such the slope of these lines changes rather abruptly at some point and rather abruptly at some point. Obviously, it is because as you can see from Exhibit No. -- I think it's 16 or 17 -- from Exhibit 16 that is caused by the variations in the rate per well which occurred during the productive life from '63 to '73. So, the next step in my analysis was simple. As long as a straight line would be drawn on one of those graphs, covering a certain period of years, we average the rate of production for that number of years. Consequently, I have here two rates of production and two indicated amounts of gas in place and on all these figures that have been collected. Do you want me to distribute this?

Q Let's do that.

(Whereupon, a discussion was held off the record.)

BY MR. MORRIS:

Q Mr. van Everdingen, you were about to explain how you had taken the next step in your analysis and reconciled or attempted to reconcile the information derived from the three-part exhibit, Exhibit No. 20. I ask you now to refer to Exhibit No. 21 and explain that Exhibit.

A No. 21 Exhibit consists of two parts. One is in tabular monographical form. The tabular form contains in Column No. 1, the number -- the tabular form consists of three sections. First of all, the average for 7-day build-up pressures. The second part refers to the long-term build ups, I think. The third part refers to figures derived from the strat test. The numbers under Slope refer to the same numbers that appear on Enclosures No. 20 which we have given you a minute ago. For example, for the long-term build-up tests, No. 1 indicates a slope of 189 and gas present of 8000 BCF. That same number, slope No. 1, covering the period that is given here, '56 through '61, that same number 8000 appears in here and over those years that are indicated 1956 to 61 the average rate of the wells was 120 million cubic feet of gas per year. Is this clear? Therefore, Column 1 is the numbers referred

to under Enclosure 20. Column 2 gives you the years on prorates the straight line on the foregoing Exhibits are suppose to develop. No. 3 is the average rate of production over those years, the average rate of a well's production over those years. No. 4 is indicated amount of gas initially present derived from that slope. Then, my last enclosure is again the last Exhibit, which is again No. 21, gives these numbers. By number they have been plotted rate of production horizontally and vertically the initial gas present as shown on the second part of my Enclosure. Points based on the same set of figures, that is points based on 7-day figures, points based on long-time have been connected. Here I have made once again and I mention on my part one point, No. 2 on the dotted line is misplotted. Anybody can see that and can rework the data because you have the fundamental data. That point should move over slightly toward the plot, the No. 2 point of the initial gas in place has derived from the strat tests, should move to the point one hundred million cubic feet per well per year and an indicated initial gas present of 17,000 BCF.

Now, as I have been trying to show in coming to

this there is a very distinct relation between the rate of production and pressure decline. It's uniformally indicated that the smaller the rate the more gas will be initially present and I don't think I exaggerate when I say there is at least from the curves as shown on the graphs there is at least 30 trillion cubic feet of gas in that reservoir. I have taken 25,000 BCF as a lower limit; good and honest data 30 trillion could very well be defended.

Q What is the effect of the misplot of point No. 2 of the strat test? Does that affect the conclusions that you would draw from this Exhibit?

A As a matter of fact I'm glad it was misplotted in one way. It confirms the conclusion of points No. 1 and No. 3 because it falls almost on a straight line and if you extrapolate that straight line down to zero rate, you know, no curving upward or downward, you get a far higher figure than I have concluded as being present, that I have given you as being present. I hope I live long enough to find out if it is still higher, but that's debatable.

Q To make sure that I understand your conclusion here from this Exhibit and this series of Exhibits, Mr.

van Everdingen, I understand you to say that these Exhibits indicate that there is at least 25 trillion cubic feet of gas initially present in the Blanco Mesaverde gas pool?

A Yes, sir.

Q How do you relate that initial gas in place to magnitude of additional reserves that can be obtained and recovered by the infill drilling program?

A Well, sir, strict relations are not present right now. We have had our reservoir engineers, and if our reservoir engineers would dust off the old mining publications by the Bureau of Mines, they would, for instance, find Custers' Relation, which gives them a rough idea as to the amount of recovery versus spacing, and you would see that on the basis of his old relation, which has been in disrepute some time, which has been in disrepute because it was not applicable to the wells then found -- but which could very well be applicable here -- you could expect twice as much as we are estimating to get from the wells as they are now. So, I made 15 trillion or 15,000 BCF, which gives you a 60 percent increase above the 9 trillion and says at the same time you're only getting 50 percent of the amount of gas that there is definitely in place. Don't consider 15,000 BCF as a holy figure. It could very well

be a lot more; could also be slightly less, but I personally think it is going to be even more than that.

Q Mr. van Everdingen, were Exhibits 13-A, 14, 15, 16, 17, 18, 19, 20, and 21 prepared by you or under your supervision?

A Yes, sir, even though they contain errors, they were.

Q And I think you previously stated that Exhibit No. 13 you confirmed to be accurate to your satisfaction by your comparison to Exhibit 12-A?

A Yes, sir.

MR. MORRIS: At this time, if the Commission please, we would offer into evidence El Paso's Exhibits 13 through 21 and 13-A.

MR. PORTER: Are there any objections to the admission of these Exhibits? If there is no objection, the Exhibits will be admitted.

(Whereupon, El Paso's Exhibits 13 through 21 and 13-A were admitted into evidence.)

MR. PORTER: Before we get into cross examination Mr. Reporter, I think the record should reflect that as used by the Witness the terms Exhibits and Enclosures

are synonomous.

Now, Mr. Morris?

MR. MORRIS: That's all we have on direct examination of this Witness.

MR. PORTER: The Witness is available for cross examination. Mr. Hensley, apparently you have been elected.

CROSS EXAMINATION

BY MR. HENSLEY:

Q Did I understand your testimony, Mr. van Everdingen, to include that from these studies you have conducted, 320 acres is not the proper spacing for this pool?

A Yes, sir.

Q What is the proper spacing?

A The proper spacing is at least 160, and could even go less than that because we are still looking at the wells outside which at revised prices might be well profitable and who are not capable of draining even 120 acres.

Q Well, is the drainage from one well uniform in the pool?

A Oh, my whole reasoning this morning has been it is not uniform.

Q What about the center of the pool; how much acreage will one well efficiently drain based on your studies?

A I think this is a lawyers' question because if that well was all by itself it could probably drain whatever is contiguous and highly permeable, however far that goes, and that is considerable interference. It's a point that I didn't stress but I could stress for engineers who want to study this pool and tell their management while better they get their proper share of the gas in place, and this reasoning is more engineering like in testifying but I would be glad to give it to you. Do you want to hear something on it?

Q Please.

A All right, I explain. If you make this type of a curve, it's hard to sell that curve, you know. Then you come to this point here, then you should always remember that in making that curve you have confused that well and that well has produced, I forgot how much -- is it on here -- no, it's not given on here, but whatever the well had produced at that and it was going at the rate of 87 MCF per day, you assume to make this curve that that rate continues ad infinitum.

You assume at the same time that the negative rate, negative rate starts when you shut-in the well and goes to infinity and by so doing you have eliminated under pressure the entire effect of the well's production and now what you have now measuring, the pressure as it would exist in the reservoir had the well never produced and that pressure if there was no -- and coming back to your question -- that pressure does not turn out to be 13,015 pounds. Where is my other 115 pounds and there you have an idea, as a matter of fact, you have an exact determination of the total interference effect of all the surrounding wells. I hope they are all your own, but if not, by your competitors on your location, and every well that I have seen in the field will show that effect. Now, it's an engineer's duty, in my book, that he investigate that and tell you why you get your share or not. As long as sand is contiguous, it will rip on out, but as long as that sand is contiguous and is not interfered by less permeability and so on, but it goes very long distance.

Q Are you telling us that your studies indicate that there is interference on the charts?

A There are about 2000 wells that show interference.

Q So there is communication in between the wells?

A There is 115 pounds here, you know; outlined in this case, there is 250 pounds. I can explain some of it by the very fact that this is not the proper pressure, although it's a lot higher than the 7-day pressure, still it's not the proper pressure because we are talking to sands at the same time interfering with one another. But if it were the proper pressure here I would be off almost 300 pounds caused by all my competitors, all that wells surrounding me, and the forms of your interference are very well known. As a matter of fact, for any reservoir, for any company, their files should be full of data that allows them to compute interference. But what do we do? We go and take these expensive tests that are being sold in the industry now, where you see some little outfit on top of the well to measure some little pressure difference at the location distance,you know, which is costly and not reliable. Here there are data begging to be examined.

Q Now, you indicate in your conclusions that you estimate a total of 15 trillion cubic feet can be recovered by using infill drilling, is that correct?

A That's right.

Q Where are those reserves located, in what portion of the field?

A They are everywhere, sir. If I may refer you to Exhibit No. 13, you know anything that is disagreeable to in log specialties is agreeable to me because this indicates that away from the field there is some sand pocket, there could be some sand pocket that is not now being drained by the well.

Q Well, I am attempting to plot the location of these wells indicated on Exhibit 15, but is this the type of structure you would expect to find in the log?

A Very often you do so.

Q In the center of the field?

A There would be more good sands present, but just as much crummy sand -- if I might say so -- will be present and it will be far harder study for the man who asked the question because in the good sand the pressure is down. You build a new well in that same neighborhood, he meets the good sand as well as the crummy sands which still hits high pressure, but the very minute that well comes in and you talk pressure measurement, that not-so-permeable sand starts feeding in the low pressures. You will never get high pressures in an interfering well if there is a good sand in it that is being drained by its neighbors.

Q Well, assuming then that these areas of high deliverability indicated in your studies do contain sands with high permeability, would you expect that in that area of high permeability in thick sand formation thickness, that drilling of an additional infill well in that area would result in recovery of more reserves than you can now recover from the existing wells?

A Yes, sir.

Q How much more?

A Sir, I don't live long enough to figure that out for you. That takes a lot of work that I cannot answer honestly.

Q Well, let me ask it this way: In the areas of less permeability and less developed sand structure you would expect to recover more reserves, more additional reserves would you not than in an area where you've got good communication and well-developed sand and permeability?

A I don't think I ever said that.

Q I'm asking you if that's correct?

A Oh, that's different. No.

Q Would you expect that the balance of these additional reserves which you indicated can be recovered by infill drilling would lie on the fringe area of the

pool as opposed to the center of the pool where the sand is more fully developed?

A I think that's a rephrasing of the question that I said "No" to.

Q Your recovery would be more or less uniform?

A Yes, except it is far more difficult to measure in the good areas of the pool because there is so much good sand present.

Q I'm also interested in Exhibit No. 15. Is there any way to tell what communication, if any, there is between these land structures on the log; is there any communication?

A You can do some work if you have a metering device for gas in a well. But since all wells, this is tight stuff, don't forget that. You can drill a well, and what do you expose when you drill a well? For every foot of sand, you expose a lot more than a foot if you just let it at the well. But if you frac a hole, then all of a sudden you get available a 100 feet of exposure of that same sand. Now, it is not possible to frac just one foot or ten feet or 20 feet. You frac sections of up to several hundred feet. How can you when you have no access when that gas can go through the fractures into the hole?

You do not know where it comes from. You know, you have to, you cannot answer your question is there communication between one sand as you see on the log and some other sand.

Q Well, assuming that, from your study, you concluded, and I think you said this, that the sand is basically lenticular throughout the whole structure?

A Yes, sir.

Q Doesn't that indicate that measurement of reserves is fairly problematical?

A Sir, the reserves, they have been measured and which have been heard of about 10 trillion, 10,000 BCF, you know, is, you might say, not an exact science. It is more a work of art.

Q But it is more inexact, is it not, when you're dealing with a lenticular structure?

A Very much so. It is going to be difficult.

Q Directing your attention Mr. Everdingen --

A (Interrupting) Make it Van and let the rest go.

Q Exhibit No. 17?

A Yes, sir.

Q The, I guess it's Column 6 indicating the average bottomhole pressure for the three strat tests?

A Yes, sir.

Q Showing a decline in pressure, if the mathematics are correct, of some 217 pounds. Is that correct, from 1959 to 1973, the differential between 1197 and 980?

A Yes, sir.

Q Does this not indicate that there is in fact drainage occuring throughout the pools facing units in the area where these strat tests are located?

A Sir, I have been trying to tell the story that from the strat-test pressures we can at least devise or can at least extract three times a different rate of decline. I'm talking by memory now. And those strat tests obviously are being drained by the surrounding wells, and by the way, the strat tests are in an area where the average well production is I think about 150 percent better than the average ultimate production for the entire field. Now, in memory, I think this one sits in an area of 5 billion cubic feet, and one in an area of 6 billion cubic feet, till the strat test is so high it surprised me. Then considering that even the strat test pressure is not a true pressure. There are in that area sands present which have still feeding in the said sand which is being drained by the wells surrounding the strat test,

feeding, which means higher.

Q I suppose the purpose of my question really is that you're not saying, are you, that you can just go anywhere in this Blanco Mesaverde pool and drill a well on this 320-spacing unit and expect to make an economic recovery on your investment. You're not saying that from your study, are you?

A I'm very much inclined to say so, sir.

Q Even though in some areas it is clear that the deliverability rates are only a small portion or fraction of what they are in the center of the pool?

A Yes, sir, because now we are talking about things where there is nothing but bad sand present. I'm just hoping that said sand will duplicate my first well.

Q So even in the areas as indicated on Exhibit No. 14, where the estimated ultimate production is --

A (Interrupting) .7 of a billion. Is that low enough for you?

Q Sir?

A .7 of a billion?

Q Yes. .7, 700 million.

A Yes, sir.

Q Based on the deliverability of the wells in that

area, is it your opinion that an operator, considering the present costs, can economically drill a well in that area?

A Sir, there is a well here, and I'm sorry, I should have -- the well in the northwest part of the field drilled by Phillips in 1951 or 2; the well gave 600 million cubic feet on the test. That well must have been -- now why was a well like that abandoned? If I compare six and 700 million cubic feet wells drilled now in '74 when we have learned a lot more about fracing than I did in the beginning of 1954, you know, I can be reasonably hopeful that I make a far better completion now than I did before. Consequently I can at least hope, or at least duplicate what I see here, and very probably get more than that.

Q That's because of better completion practices and procedures?

A Not regarding that would be impractical, yes, sir.

Q What would be the effect on an off-set operator in this pool if he was delayed, say, as much as 2 years, in drilling an infill well, but offset an adjoining, contiguous location; would he be drained?

A Drainage would start.

Q Would he be substantially drained?

A No, sir. It would depend.

Q Would it depend on the area of the field that the well is drilled in?

A If it's in one of those low productive areas, he wouldn't be drained at all.

Q But on the contrary, if it's one of the high productive areas, he would be substantially drained, isn't that correct?

A But that's an operator who lets himself be off-set -- in a high productive area, I don't think that is a practical question.

Q It's practical if he can't get drilling rigs in time to drill a well.

A It's surprising to me that the whole congregation you cannot get drilling rigs and drilling parts or El Paso seems to be able, or threatens to be able to do so. Are they supermen? I don't believe so.

Q Apparently they are.

As I understand it then there is a difference in the amount of acreage being drained by the existing wells dependent upon the location of those wells in the pool, is that correct?

A Yes.

Q So, in some areas an additional well may not result in much increase in recoverable reserves whereas in other areas it might substantially increase recoverable reserves. Is that a fair statement?

A What do you mean by "recoverable reserves"?

Q Reserves that can be recoverable from either one, an existing well or --

A (Interrupting) As of today?

Q Sir?

A As of today?

Q Yes.

A As of today or from the beginning, what are we talking about?

Q As of today.

A I think my first answer still holds, that in both cases you will see a similar amount of increase in ultimate over the structure. Now, there are deviations, no two ways on it, but that phase of the drainage problem has not been studied.

Q You have studied the overall pool and not the relationship of an operator who has segregated leases in a portion of the leases?

A I was not paid by El Paso to solve your problems.

MR. HENSLEY: Right. I pass the Witness to Governor Campbell.

MR. PORTER: Governor Campbell?

MR. CAMPBELL: Passes.

MR. PORTER: Mr. Byrd?

CROSS EXAMINATION

BY MR. BYRD:

Q If it is permissible, I will refer to the Witness as Tony as I have known him for several years. Tony, I believe, if I understand your testimony, you estimated that there will be an increase in total recovery from this pool of about 6 trillion additional cubic feet of gas by the infill drilling, is that correct?

A That is correct, sir.

Q And you base that on original estimated recovery from the one well on the unit spacing 9 trillion cubic feet and you're increasing it up to 15 trillion cubic feet?

A Yes.

Q Well, would this then indicate if you didn't drill the second one that the old wells remain approximately 40 percent of the original gas in place, or recoverable gas in place under the other 160 acres?

A There would be some drainage to that. The way it states here we will get 33 percent of the gas in place as I see it. Now, from the present wells taking 9000 BCF as ultimate for the pool and 30,000 BCF as initial present, and some of that gas will undoubtedly come from the areas that were adjacent to locations which is the present existing well. At the same time, if you drill a well, some of the gas under the lease that you're in now, but has not connected under the 60 acres that's being drained now will go to the new one because we did not find an outlet into the present well.

Q Well, wouldn't it be a correct assumption that if there had been no drainage of the existing well on the unit from that other quarter section that you would have increased your ultimate recovery reserve by 9 trillion instead of 6 trillion. In other words, if there was a wall around each quarter section out there, you would have had an increase of 9 trillion rather than 6 trillion wouldn't you?

A Even Custer was not that optimistic, sir; I have looked at that name so long you know, somebody ought to help me out here. That was the old famous spacing rule that was around here and very valid in the early '30s.

VOICE: Cutler, Cutler, sir.

MR. van EVERDINGEN: Thank you sir.

BY MR. BYRD:

Q One final question. In an answer to a question in cross examination as to whether or not such a well is economically feasible, you referred to a Phillips well that was drilled in the early '50s and abandoned.

A Yes.

Q Do you know what the price was of gas at that time?

A It was the price in 1951 or '52. I don't know what the price was. I know that the well was abandoned because it was too far, you might say, out in the boondocks. Way out, and there was no connection and there's not yet. I understood that somebody was interested in the leases and I think the State University, State of New Mexico lease, and has yet to be sold. Still not in production.

Q When you concluded in answer to counsel's question that the new well on the unit would be economically feasible were you assuming that the price of gas was 44 cents as El Paso did in their Exhibit?

A I now said, when I repeat it, yes, the .7 billion I had in mind the 44 cents.

MR. BYRD: Thank you, sir.

MR. PORTER: Anyone else have a question?

MR. CAMPBELL: Mr. Chairman, returning to the Commission after so many years, I'm so stunned by a hearing on narrow spacing that I'm speechless. I think I'll rely on my own witness, and only reserve the right to move to strike some of Mr. Derrick's Exhibits when I have an opportunity at the lunch hour to review them on the basis of the testimony of Van did not provide an adequate basis for some of the data in those Exhibits.

MR. MORRIS: I have one question on redirect.

MR. PORTER: Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Van, in drawing your Exhibit No. 14, whose ultimate recovery figures did you use? Did you use the ultimate recovery figures that El Paso calculated on Exhibit 3?

A Oh, no, I haven't even a copy of that one. We have most of them in our own files and you know how to make them. I mean that's normally done. You block cumulative figures --

Q (Interrupting) In other words, the figures are

your own independent pressure decline?

A How independent is a man who sees all kinds of figures? There's ways of making them, you know, they're always slipping in something of somebody else, but they are our own figures.

Q So El Paso's Exhibit No. 3 didn't enter into your preparation of Exhibit 14?

A Not at all, but since you may ask,one thing, yesterday when you asked questions you concluded it's a hybrid. That hurt me. It's not. There is nothing hybrid about it. This is an estimate of the amount of gas in place, but based entirely on pressures and recovery efficiency because under the conditions as sketched here and relations does exist. I hope Mr. Cutler is retired,even though it stuns Mr. Campbell.

Q So you did your pore volume calculations?

A No, sir. I have made them, not many of them and I am always in trouble and I have all these fights on my hands and I give up on that one.

Q Well, I can appreciate that it would be difficult to make a pore volume calculation when you've got wells like this one.

A Thank you sir.

Q While we've got this Exhibit in our hands, it appears that there is a big variation in the number of net feet of pay in these wells. Did you make any calculation as to comparable net feet of pay in these two wells on Exhibit 15?

A No. I have asked, there is another one on here that I didn't specifically mention and it was brought out by El Paso. I went to the log specialist we have because one is run at twice the speed of the other, and they say that makes a difference to any amount of sand discovered. Now, I'm not sufficiently versed, but since I couldn't use it in any event, I found out that if I believed the log analysis -- and as optimistic as I could make them -- even the 10 trillion cubic feet of gas could hardly be too stingy.

Q So we do have a wide variation?

A Yes.

Q Is this typical of what you would find throughout the reservoir if you compared --

A (Interrupting) I have a dozen more of the same like that, yes, sir.

Q If you compared two wells a mile apart, you would find this quite often then?

A Yes, sir. You find in the middle part you find beautiful sands that go quite across a few wells, but at the same time you find this mediocre stuff.

Q Now, what was the original pressure in this reservoir, Mr. Van?

A Well, I have used 13,000. I've looked everywhere, I've looked in all the pressure. There are some measurements which are even to thirteen sixty, but I have used 1300 pounds initially.

Q Well now if we had all of these sands or lenses contained in the matrix out there, would these sands or lenses have been in communication with each other through geological time?

A I think so, sir.

Q Then the pressures in all of them would have been the same originally?

A Yes, sir.

Q Then the original pool pressure then we can accept as being 1300 pounds in all of the sands?

A There is, of course, a little variation because some sands are higher and lower and there is the gravitational effect, but we are talking here about sands on which enough core data is available which are so tight

that it is next to impossible for water to move through in volume and, to be sure, because if water moves through the pressures are higher than they should be for the same amount of gas that was taken and I have made a trip to the fields to convince myself and somebody comes around and says, "Can we make water," and we made water. The idea was make some water in wells along the Colorado State line here, so I asked how much water do you make and the answer is it's troublesome, you know, it's a barrel per million cubic feet of gas, which could just as well be condensate. I mean water collected on account of temperature differences between the surface and under.

Q Well, now the three strat tests that were drilled and taken, if we plot the locations of those three strat tests on your Exhibit No. 13, isn't it true that we find that each one of them is outside the area marked as the area of most prolific wells?

A Yes, sir. But it is in the area of far more than average wells.

Q Now, you said that in determining your ultimate production you used your own figures for drawing map No. 14. I think you also mentioned that the strat tests were wells in areas averaging about 6 billion ultimate

cubic feet recovery, is that correct?

A I have wrote a few figures from this test in quoting that, you see, here every figure shown is really an average of 8 wells. I didn't feel that probably we make them. We make figures ultimate for all kinds of clients, you know, but I should give here individual well figures. Therefore, average 8 wells and leave it to some engineer to unravel them again to see how much he had out of the well in that 8 series.

Q And so you said that they would average about 6 billion cubic feet in the area of the strat test?

A Yes, sir.

Q I think you also stated that these strat tests were in areas about 150 percent better than the average recovery for the pool?

A Well, yes, I take an average recovery for the pool to mean 4 billion.

Q 4 billion, so you are in agreement with El Paso's Exhibit 3 then where they derived 4 billion as being the average recoverable reserves?

A Again, that's not a holy figure, Mr. Nutter, you know that as well as I do. A 10 percent valuation doesn't phase me at all.

Q Well, now, if we take your Exhibit No. 17, we note that the 1973 reading for the three strat tests, I presume that's the average for the three wells, is that correct?

A Yes, sir.

Q What percent is that of the original pressure in the pool?

A That should be 980 over 1300; it's about 75 percent.

Q 75 percent, so these strat tests exhibit about a 25 percent drawdown?

A Yes, sir.

Q That's each strat test on 160-acre tract surrounded by 4 wells?

A Yes.

Q Fully developed area?

A Yes, this is a fully developed area. May I remind you I contended always strat tests, even strat tests don't show average pressure under the acreage they're located on. I won't ever let you go by on that one. There are some more pressure units, you know, and I wish I could devise a system or line of thought to qualify that, to make it more precise, but I haven't been able to do that.

Q But approximately 25 percent drawdown for the average strat test?

A Yes.

Q Now you have said that you estimate that at least 15 trillion cubic feet of gas could be produced from the pool as a result of the infill drilling whereas 8.7 or 9 million would be produced as a result of one well per 320 acres?

A Yes, sir.

Q So this is approximately a 70 to 75 percent increase in production then, is this correct?

A Yes, don't make it 75, let's make it 66 to 70.

Q But it corresponds fairly closely to the 25 percent drawdown that we've had there now. In other words, 75 percent pressure is still there so 65 to 75 percent of the gas would be produced then as a result of the infill well?

A Yes.

MR. NUTTER: Thank you.

MR. PORTER: Does anyone else have a question? Mr. Morris, you indicated --

MR. MORRIS: (Interrupting) No, I have no further questions.

MR. PORTER: The Witness may be excused.

MR. MORRIS: If the Commission please, that would conclude El Paso's presentation in this Case.

MR. PORTER: Thank you. Governor Campbell? Or Mr. Hinkle?

MR. HINKLE: Mesa is prepared to go ahead with their testimony. We'll go first unless somebody else would rather go first. We have one witness and we have one large Exhibit to put on the wall, with two overlays. Because of the nature of the Exhibit, we do not have copies. I would suggest we have a recess for about 10 minutes.

MR. PORTER: We will take a 10-minute break.

(Whereupon a 10-minute recess was held.)

MR. PORTER: The Hearing will come to order and the Commisaion will recognize Mr. Hinkle.

MR. HINKLE: If the Commission please, our Witness, Mr. Tom Morris, was sworn yesterday, I believe.

(Witness previously sworn.)

THOMAS W. MORRIS

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name, your residence and by whom you are employed?

A My name is Thomas W. Morris, I'm Manager of Production for Aztec Oil and Gas Company, Dallas, Texas, address 2000 First National Bank Building, area code 75202.

Q Are you a Petroleum Engineer?

A I'm a Petroleum Engineer.

Q Have you previously testified before the Commission?

A No, sir, I haven't.

Q State briefly your educational background and experience as a Petroleum Engineer.

A I'm a graduate of the University of Oklahoma with a Bachelor of Science Degree in Petroleum Engineering. Prior to joining Aztec I worked with Sun Oil Company for 22 years in operations, engineering and management capacities in southeast New Mexico, west Texas, U.S. Gulf Coast, Venezuela and Iran. I was head of the Petroleum Engineering Department for Venezuela and Sun Oil Company, advanced there to manager of the Venezuelan operations of Sun Oil Company, was Vice President and

General Manager of Iranian Sun Oil Company. I returned to the States last year, joined Aztec as Manager of Production in June and our department is responsible for drilling production and engineering activities of the Company.

Q Have you made a study of the Blanco Mesaverde Pool?

A Yes, we have.

MR. HINKLE: Are the Witness' qualifications acceptable?

MR. PORTER: Yes, they are.

BY MR. HINKLE:

Q Have you prepared or has there been prepared under your direction exhibits for introduction in this Case?

A Yes.

Q And they are Exhibit 1, which is the large exhibit on the wall, and two overlays which have been marked as Exhibits 1-A and 1-B, and also Exhibit 2?

A That is correct.

Q Refer to Exhibit 1 and explain what this is and what it shows?

A Exhibit 1 --

Q (Interrupting) You can get up and point out if

you want to.

A Okay. This Exhibit is a deliverability map of all of the Mesaverde Pool wells in the San Juan Basin. The various colors indicate areas of high and low deliverability. The yellow areas are those areas with high deliverability. The green is the next area, blue, and the forced area in red. The yellow represents those areas where the deliverability is in excess of 1000 MCF a day. The green area represents those areas where deliverability ranges between 500 to 1000 MCF a day. The blue, 200 MCF to 500 MCF, and the red areas are those wells which are below 200 MCF a day.

Q Does this also show the wells in the Mesaverde Pool?

A It does. Some 2060 wells.

Q How many wells are in the yellow areas, which is 1000 or over?

A The yellow area has 50 wells.

Q How many has the green area?

A 270 wells.

Q And how many in the blue area?

A 550

Q How many in the red?

A 1190, over half of the wells are in the red area.

Q This totals 2060 wells?

A That is correct.

Q I believe in El Paso's testimony yesterday they indicated 2055 wells. How do you account for this discrepency?

A This is probably a well count. We took this information from the New Mexico Oil Conservation Commission, San Juan Basin Gas Exploration Schedules.

Q Is there anything else you would like to say with respect to this Exhibit?

A I think, as the colors show, the best area of the field is in the center, the yellow, and of course on the fringes is a low productivity area.

Q Now, if you will put up the overlay Exhibit 1-A. Mr. Morris, refer to Exhibit 1-A, being the overlay on Exhibit 1, and explain what this is and what it shows.

A This overlay has on it the acreage of El Paso and Aztec. The El Paso acreage is in green, and the Aztec acreage is in red. The El Paso position, as you can see, they cover a large amount of the yellow in the central portion of the field. The Aztec acreage, the majority of which can be seen on the map, covers the

northwest segment of the field and over 50 percent of Aztec's wells are located in the red area or less than 200 MCF per day.

Q Does El Paso have a large number of wells in the yellow and green area, the largest number?

A They have a substantial position in there and as compared to other operators they would be the largest operator in the high productive area of the field.

Q Is there anything else you would like to say with respect to this overlay?

A Nothing at this point other than to repeat that the people in the center of the field versus those on the fringes, have a deliverability advantage.

Q Now, if you will put up overlay 1-B. Now Mr. Morris, refer to Exhibit 1-B and explain what this shows.

A 1-B shows the pipeline connections of El Paso and Southern Union. In Aztec's case --

Q (Interrupting) By what colors?

A Pardon me. Yellow is the El Paso pipeline and the blue is Southern Union gathering.

Q In other words, these are the gathering systems which show the wells that El Paso has connected to and the ones that Southern Union is connected to, is that

right?

A That is correct.

Q How many wells does Aztec operate?

A We operate 130 wells.

Q How many of those wells are connected to the El Paso system?

A 23

Q And how many are connected to the Southern Union system?

A 107.

Q I believe that you have already testified that none of your wells are in the area of high potential?

A The majority of our wells are in the northeast corner. None of our wells lie in the yellow area that we operate.

Q And this indicates that all of the El Paso gathering system is connected to the wells of higher potential in the pool?

A That is correct. El Paso's pipeline covers the center portion of this field.

Q Now refer to Exhibit No. 2 and explain what this is and what it shows.

A Exhibit No. 2 shows the pressures on the two

systems, the Southern Union gathering system and the El Paso gathering system. The top curve on the chart is the pressure for the past four years on the Southern Union gathering system, which most of our wells produce into. The bottom line is the El Paso system, and as of 1973, there was 100 pound differential, the El Paso system having a pressure 100 pounds lower than the Southern Union system.

Q From what information did you obtain this to put it on the drawing?

A This information came from the New Mexico Oil and Gas Engineering Committee Annual Report for the years 1970, '71, '72, and '73.

Q Where did the information come from for the preparation of Exhibit 1?

A That was the New Mexico Oil Conservation Commission Gas Exploration Schedule, July, 1974.

Q Now, from your study of the pool, and from these exhibits, what do you conclude?

A El Paso has located both of their operations and their pipeline connections in the areas of high deliverability from the Mesaverde Pool. Aztec, on the other hand, is located on the fringes of the Mesaverde pool in

areas of low deliverability.

Q Those are referred to as marginal areas?

A I'm calling marginal areas the 200 MCF and below. The red areas are those that are critical. To go on further, that if El Paso's Application is approved for the infield program, we would assume that the logical place to start such a program would be in the high deliverability area and spread out. We can see ourselves getting in a position to protect our rights to drill or be required to drill in fringe areas and possibly marginal or sub-marginal non-economic wells. Assuming that it is approved, the infield program, due to most of our wells being tied to Southern Union, El Paso has testified that they would take all the gas that the operators would develop. We don't know whether our gas would see a market or not.

Q Well, are you obligated by contract in any way so it would prevent you from giving your gas to El Paso in that case?

A Our contracts, or for the lack of a lease, to the pipeline connection that we have.

Q To Southern Union?

A Southern Union or El Paso on those 23.

Q If Southern Union did not have the capacity to take your gas, this would mean you could not sell it to El Paso?

A We could not sell it to El Paso unless Southern Union made some arrangement to take it from, or deliver gas to El Paso. It starts a chain reaction: If, for instance, El Paso gets their lines filed from the operators who are connected to them, there would be no capacity for Southern Union and El Paso to make an arrangement as they have in the past.

Q There is no rateable take in the pool?

A There is not a ratable take in the pool.

Q Now, if El Paso does off-set some of Aztec's wells, what is Aztec's position with respect to meeting these off-sets?

A Of course I would have to evaluate it, but if it would go to market we would have to evaluate, if we have an economic well that we could drill off-setting it; our position is that we would have to see what it is at the time whether we could afford to off-set it or not.

Q Well, if it's in the time we have now, where there is a shortage of tubular goods; what would be Aztec's situation?

A At this time, where we're on allocation, we could probably, without going into gray market for materials, and assuming the rigs are ready, some 12 wells is about what we can see for say next year.

Q That's 1975?

A 1975.

Q Do you have any other commitments beside this area?

A Yes, we do. We have southeast New Mexico, which is one of the prime areas that we are considering and also working in now. There is the opportunity to develop some substantial reserves; we do have heavy commitments there. We also have other opportunities in the San Juan Basin when the price, and when we can be assured that our gas will see the market.

Q How many other undrilled locations outside of the Mesaverde area do you have in the San Juan area?

A We have a substantial number in other reservoirs and even some in the Mesaverde.

Q If you devoted all the tubular goods that you can get here, it would prevent you from developing other acreage which you could develop and probably gain as much or larger reserves?

A It would curtail our other programs that we have, yes, sir.

Q I believe that El Paso's testimony showed that the cost of drilling the average well in the Mesaverde was $110,000. What do you estimate the cost to be?

A We have a higher estimate than El Paso and our estimate for drilling and completing a typical Mesaverde well in this area, insulation surface facilities, getting it ready to go on stream, is $139,800.

Q Is that assuming mill prices for tubular goods?

A It does. Mill prices -- what we use --

Q (Interrupting) What if you had to buy the tubular goods on the gray or black market?

A It would increase our estimate of a well in this area to the range of $168,000.

Q What percentage of the entire San Juan Basin does the Mesaverde Gas Pool represent as far as gas reserves are concerned?

A On the reserve part -- we haven't done all the reserve -- but on a production basis the Mesaverde represents slightly in excess of 40 percent of the San Juan Basin production. It is the largest producer in this area.

Q Do you have any further recommendations to make to the Commission in connection with this matter?

A Our looking at it, and our position to protect our rights here, we think that it's not the proper time to go to this infill program; we're short of materials, it's going to take some study on our part of which wells would be economic units, we don't have the price that's been discussed here, and we're still getting the same price today that we got say last week, so we think it's a big question of -- and time is needed to look into it, say with some depth. So, we would like to see it postponed.

MR. HINKLE: That's all of the direct.

We would like to offer in evidence Exhibits 1, 1-A, 1-B, and 2.

MR. PORTER: Are there any objections? The Exhibits will be admitted.

(Whereupon, Aztec's Exhibits Nos. 1, 1-A, 1-B, and 2 were admitted into evidence.)

MR. PORTER: At this time we're going to recess the Hearing until 1:30, at which time Mr. Morris will be available for cross examination.

(Whereupon, the noon recess was held.)

MR. PORTER: The Hearing will come to order. Mr. Morris is available for cross examination if anyone has a question. If there are no questions, the Witness may be excused.

The Commission will recognize Mr. Byrd for Mesa.

MR. BYRD: Thank you Mr. Chairman. Mesa will have one Witness who was previously sworn. His name is Les Carnes.

(Witness previously sworn.)

L.M. CARNES

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

DIRECT EXAMINATION

BY MR. BYRD:

Q Mr. Carnes, for the record would you state your name and address?

A L.M. Carnes, Box 2009, Amarillo, Texas.

Q By whom are you employed?

A Mesa Petroleum Company.

Q And what is your position with Mesa Petroleum Company?

A Senior Reservoir Engineer.

Q State briefly your professional experience.

A Upon graduation from Texas Tech with a Bachelor of Science Degree in Petroleum Engineering in 1957 I worked 10 years with Continental Oil Company in various reservoir engineering capacities, 7 years with Tenneco, and approximately 1 year with Mesa Petroleum Company.

Q Are you a member in good standing of any professional societies?

A Yes, sir, S.T.E. of the A.I.M.E.

Q Have you previously testified before this Commission?

A No, sir.

MR. BYRD: Mr. Chairman, would the qualifications of Mr. Carnes be accepted?

MR. PORTER: Yes, sir, they would.

BY MR. BYRD:

Q Mr. Carnes, are you familiar with the present field rules in the Blanco Mesaverde Gas Pool?

A Yes, sir.

Q How many wells does Mesa have an interest in in that pool?

A Approximately 450.

Q How many wells in the pool is Mesa the operator of?

A 26.

Q Have you prepared a map of the pool showing Mesa's acreage in the pool?

A Yes we have. It's shown as Exhibit 1.

Q Is that the Exhibit that is on the board at the present time?

A Yes, sir, it is.

Q Referring to what has been marked as Mesa's Exhibit 1, please explain what that map shows.

A Exhibit 1 is a location plat showing all of Mesa's interest colored in yellow in the Basin. It also shows the Mesaverde wells that are drilled on Mesa's acreage and the immediate off-set acreage.

Q Does it show who owns the off-set acreage?

A Yes, it does.

Q In how many instances is Mesa's units off-set by units operated by El Paso?

A Approximately 130.

Q In the units in which Mesa owns a partial interest but is not the operator, who is the operator of the wells?

A In most instances it is El Paso.

Q Are there some instances where there is another operator?

A Yes.

Q And who would they be?

A Maybe Tenneco, or Aztec; I'm not sure about those few cases.

Q All right. Are you familiar with El Paso's application in this proceeding?

A Yes.

Q And you understand they are seeking amendment to permit the second well on the unit?

A Yes, sir.

Q Have you made a study of the economic feasibility of a second well on the unit as proposed by El Paso?

A Yes, I have.

Q Referring to what has been marked as Exhibit 2, would you please explain what is depicted on that Exhibit?

A Exhibit 2 is a graph showing the new-well economics, this is an infill well in the Mesaverde pool, in terms of average annual rate of return.

Q Explain to the Commission what's shown on the horizontal scale of Exhibit 2.

A The horizontal scale shows the arrange of

incrementals new reserves that a well would possibly develop -- an infill well that is -- as a percent of the old well's original-ultimate-recoverable reserves.

Q I notice that you use on the Exhibit, "Percent of old ultimate." Would you please explain what you mean by that?

A The old ultimate is the average old well's original-recoverable reserves.

Q So the percentage here is that new reserve is expressed in a percent of the original-recoverable reserves of the original well, is that right?

A Right.

Q Now, I notice in looking at Exhibit 2 that you have assumed that a new well -- and is this an average new well that you're talking about?

A Yes.

Q Will recover new reserves equal to between 30 to 70 percent of the original-recoverable reserves under an average old well in the pool, is that correct?

A Yes, sir.

Q How did you arrive at the range of 30 to 70 percent?

A We have not made a detailed reservoir engineering study of the Mesaverde field, and recognizing that some

additional reserves would probably be produced, we covered a range that we thought would apply to the new well.

Q And what reserve did you use for the average existing well in the pool in your calculation?

A Approximately 4.8 BCF.

Q Now, referring again to the Exhibit, what is it that is shown on the vertical scale of Exhibit 2?

A The vertical scale shows the average annual rate of return in percent that you could realize by drilling an infill well. The average annual rate of return would be defined as that percent discount that when applied to the future net revenue would approach the cost of drilling and incurring the new well.

Q Well, what perimeters did you use in determining the average annual rate of return for a new well on Exhibit 2?

A We used the cost to drill and equip a new well of $152,000; we used a gas price of 24 cents, which when adjusted for tax compensation in BTU was 27.7 cents mcf. We used an operating expense initially of $200 per well a month escalated at 5 percent a year for a maximum of 25 years to about $450 per well a month and kept it constant from that time forward.

Q What price did you use for the sale of the liquids produced in conjunction with the gas?

A We used $10 a barrel.

Q In your parameter did you take into consideration in your expenses any income tax?

A No, we did not.

Q Now what rate of production did you use for the new well in calculating your average rate of return on Exhibit 2?

A Again, we did not know what the new well would come in at so we varied this between 300 mcf per day, which is approximately the average old-well rates at the present time, to 900 mcf per day.

Q All right. Now, explain to the Commission, and I will ask you to refer to the top curve on Exhibit 2, explain exactly what that curve shows based on the parameters that you've used.

A The top curve, which reflects an initial producing rate of 900 mcf per day for a new well, indicates that at the lower incremental recovery of 30 percent your average annual rate of return would be approximately 14-1/2 percent while for the maximum incremental amount of reserves of 70 percent it would be something over 18

percent.

Q All right. Now explain what the middle curve indicates.

A For the lower reserves again it shows about 10 percent average annual rate of return increasing to about 16 percent at the maximum incremental recovery of 70 percent, and the bottom curve -- or the percentage is shown on -- and the bottom curve at the lower incremental recovery shows about 9 percent average rate of return increasing to just over 14 percent for the 70 percent case.

Q At a rate of return from somewhere approximately 9 percent to approximately 18-1/2 percent, is this an attractive or sound economic investment for Mesa at this time?

A We do not think it is.

Q What is Mesa paying for its capital or borrowing at the present rate?

A Approximately 15 percent interest.

Q Do you have any other comments regarding Exhibit 2, Mr. Carnes?

A No, sir, I do not.

Q Now referring to what's been marked as Exhibit 3,

will you please explain what is shown on this Exhibit?

A This is also graphs showing the new infill-well economics in terms of the 15 percent discount at future-net revenue. It also shows the case where the initial rate varies from 300 mcf per day to 900.

Q Is the horizontal scale on this Exhibit the same as on Exhibit 2?

A Yes, it is.

Q It was determined on the same basis?

A That is right.

Q Now please explain the vertical scale on Exhibit 3.

A The vertical scale represents the 15 percent discounted future-net revenue generated by an infill well.

Q And that's expressed in thousands of dollars?

A Yes, it is.

Q Referring to the top curve on the Exhibit, what does it indicate?

A The top curve indicates that at the 30 percent increase in reserves over the original ultimate for an average old well that you would realize of the present day value discounted 15 percent of about $149,000, which is something less than the cost to drill the new well,

while at the higher incremental recoveryof 70 percent it shows that you would realize approximately $175,000.

Q Will you explain to the Commission what the two lower curves show?

A The middle curve, where you expect a rate of about 600 mcf per day, shows that the lower reserve gain about $125,000 while for the 70 percent incremental reserve gain about $157,000.

Q And the lower curve?

A The lower curve reflects a 15 percent discount at future net revenue of approximately $115,000 increasing to about $145,000 under conditions of the 70 percent incremental reserve case.

Q Based on the cost of a new well of $152,000 would the drilling of an average additional well be economical based on the 15-percent discounted future-net-revenue test?

A In my opinion it would not.

Q So is it your conclusion from this, Mr. Carnes, that based on a 27 cent price for the gas from a new well it's not economically feasible to infill drill at the present time?

A That is correct.

Q Do you have any other comments to make on Exhibit No. 3?

A No, I do not.

MR. BYRD: If the Commission please, that concludes Mr. Carnes' direct testimony. At this time I move the admission of Mesa's Exhibits 1, 2, and 3.

MR. PORTER: Are there any objections? The Exhibits will be admitted.

(Whereupon, Mesa's Exhibits Nos. 1, 2, and 3 were admitted into evidence.)

MR. BYRD: I submit Mr. Carnes for cross examination.

MR. PORTER: Any questions of the Witness?

Mr. Morris?

CROSS EXAMINATION

BY MR. MORRIS:

Q Mr. Carnes, I'm sure you testified to this very clearly, but I want to make it double clear, I guess, for the record, that your presentation for both Exhibits 2 and 3 assumes a price of 24 cents plus BTU adjustment. That does not assume the new gas price afforded by FPP Opinion No. 699, is that correct?

A Yes, that's correct.

Q Now, if you testified to it I missed it, but what would you say with respect to Exhibit 2 would have to be judged as an acceptable rate of return for Mesa?

A Well, we didn't say what an acceptable rate of return would be to Mesa. We just stated that under these economics reflected in Exhibit 2 that that was not acceptable.

Q You're saying that assuming your best situation on Exhibit 2 a new well producing at an initial rate of 900 mcf per day and a 70 percent incremental reserve which would yield a 19 percent rate of return, that would not be sufficient?

A No, sir.

Q Well, what would be sufficient?

A Well, I think our management is in a better position to answer that than I, but if you consider the cost of money right now at 15 percent, we would certainly want to recover a significant incremental amount more than that. Maybe 10 to 15 percent on top of that, which would indicate an average annual rate of return of 25 plus percent that we would have to have on the investment.

Q What price would you have to have to yield 25 percent rate of return under your -- I'm asking you to keep all the same assumptions but tell me what price you

would have to have before you would have an acceptable rate of return?

A Well, I have not made that study to see what it would be to get it there.

Q Can you say just looking at the new gas price afforded under Opinion 699 that that would be -- assuming with me if you will -- that that price would be applicable to the infill wells, that would provide sufficient incentive, a sufficient rate of return, where your management would find that sufficiently attractive to enter into this program?

A It's possible that it would. As I said, we have not really made that determination.

Q Referring to Exhibit No. 3, taking your worst possible case there, which was an initial rate of 300 mcf per day and only 30 percent incremental new reserves and discounting future net revenues by 15 percent, if I understand your exhibit that should show discounted revenue of say $118,000?

A Approximately.

Q Now when you say "net revenue" does that mean after you have recovered the cost of drilling?

A No.

Q What do you mean by that?

A That's just the cash generated after you pay lease-operating expenses and royalty.

MR. MORRIS: I have no further questions.

MR. PORTER: Does anyone else have a question of this Witness?

Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Carnes, in arriving at these figures that you have used here, you said that your original estimate was 4.8 billion per well, that's the basis average, is this correct?

A That's the average well in the New Mexico portion of the Mesaverde reservoir.

Q And you've considered that the well that would be drilled on the other 160 would encounter from 30 to 70 percent of the 4.8 billion, is that correct?

A Yes, that's right.

Q Now, we have these three various initial rates that you've used, 300 to 900, now what about your production decline; what did you figure on production decline?

A In the case of the 900 mcf per day initial rate

we assumed that the well would decline fairly steeply in a couple of years to the average old-well rate of 300 mcf per day and then go in a constant very general decline from there to the economic limit.

Q What percent is that constant low rate decline?

A It varies from as low as 2.9 percent I believe to as much as 7.9 depending on the recoverable reserve case.

Q How long generally does it take the well to decline from 900 to 300 in its deliverability?

A Well we said a couple of years.

Q A couple of years on that?

A Yes.

Q And then 25 to 45 years on the remainder?

A Yes, that's approximately right.

Q What does Mesa consider to be abandonment pressure in this pool?

A We have not made a reservoir determination; we just use an economic-limit rate of 60 mcf per day and force the reserves to be recovered inbetween those limits.

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

MR. PORTER: Does anyone else have any questions? The Witness may be excused. Thank you.

Mr. Byrd, did you offer your Exhibits?

MR. BYRD: I did offer them, and I think they were admitted.

MR. PORTER: Well, your Exhibits are admitted.

MR. SWAN: Oscar Swan representing Amoco Production. I realize it is a little late for an opening statement and way too early for a closing statement, but we support El Paso's position but we got there in a little different manner and I think if I could give a little bit of our ideas on the law here and then put Mr. Giles on for just a short statement we will be through in 5 to 10 minutes.

MR. PORTER: Are you going to give the testimony or is he?

MR. SWAN: I'm simply going to comment on the law, on what we think the law is or how it should be interpreted here and I'm going to have him try to explain to you why Amoco reached the decision to support El Paso here from an engineering standpoint.

MR. PORTER: You may proceed.

MR. SWAN: First, we feel this Case is a good deal simpler than the people have tried to make it. We believe there has been an awful lot of testimony and a lot of argument on things that are not really pertinent

to the issue. For instance, we don't agree with El Paso's idea that their marketing problems are pertinent to the issues or relevant evidence. I guess maybe the opposition invited it by making the issues themselves when they tried to show that El Paso, because of its utility position, is in a different position from other operators and can look at these wells differently, but we don't think that the Commission should consider that or that it should consider any evidence of the nature that one operator has more money or more pipe or more locations or a tax position that makes the drilling of additional wells desirable. In our opinion there are just two questions here and that is: (1) Will these wells produce some additional gas that won't be produced by the present wells, and (2) if they will, will the additional income justify the expenditure, and I think that is all that is before the Commission and that's how we arrived at our decision. Those are the two questions we looked at.

Now I realize that there has been some talk here about this 44 cent gas price not applying, but it seems to me if the Commission accepts El Paso's proof that these wells will produce gas that the existing wells will not produce, you've brought yourself within the spirit

and letter of the FPC opinion and frankly we are willing to take that chance. That's much less of a chance than the chances you take just drilling the well.

We also figure that this is to prevent waste and the Commission should do that first. There has been some talk about how this will impair correlative rights because all of the wells will not be drilled and can't be simultaneously, but that situation exists everywhere and it's now under the present Order and it won't be changed by anything new. But, since we did, I guess, take a very simplistic look at this, we looked at it differently from an engineering standpoint, at this point I will turn it over to Mr. Giles.

MR. PORTER: Let the record show that Mr. Giles has previously been sworn.

MR. SWAN: Yes, he has been sworn.

R.B. GILES

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

DIRECT EXAMINATION

BY MR. SWAN:

Q Mr. Giles, have you previously testified before this Commission?

A I have.

Q Just for the record, would you state briefly what your education and experience has been and what your present duties are?

A Yes. First of all, I am R.B. Giles with Amoco Production Company in Denver. I'm a graduate from Penn State University in 1948 with a Bachelor of Science Degree in Petroleum and Natural Gas Engineering. I have been employed by Amoco for 26 years in various engineering and supervisory engineering capacities. My present jurisdiction and responsibility is to negotiate the terms of equity and other important provisions in secondary recovery field-wide units and to testify before State Conservation Commissions in 14 western states for Amoco. This geographical area covers from the Mexican to the Russian border.

Q Mr. Giles, you have, for the purpose of testifying in this Case, studied this field?

A I have.

Q What is the position of Amoco in this Case?

A Let me preface that with the fact that Amoco has 96 net wells and we operate 84 wells in the Blanco Mesaverde pool. Our net share of this pool's production

is currently 17.7 BCF per year and 88,000 barrels of condensate per year. On a graph basis daily that computes to be 48-1/2 million cubic feet a day and this represents about 7 percent of the gas production in this pool. As Mr. Swan has said, we do support the Application of El Paso in this Case and we do it for these reasons: First the nation does need more gas and increasing the gas supply from this pool over the next four to five years by infill drilling could, in its own way, help bridge the gap before coal gasification begins in a big way as another means to improve the gas-supply picture. Now, if this infill program is granted by this Commission for this pool Amoco intends to proceed very cautiously. Now, right now a go-slow drilling program is necessitated by the constraints of casing being in rather short supply and the rig availability being somewhat in question. What we envision with an infill drilling program in the Blanco Mesaverde is that it really won't start until about a year from now and then it will consume a goodly portion of the ensuing four to five years, and Amoco does not intend to be aggressive with a number of rigs in here to infill drill but we will consider meeting any off-set obligation as it appears. And like Mr. Derrick said

yesterday in his testimony: We too have priorities we assign to wells we would like to drill within our division and some in Wyoming may have precedent over the Blanco Mesaverde. We have to look at each well individually as the time comes up and let it stand on its own feet. Secondly, and this is the crux of the whole problem on this Hearing: Reserves. We know some increase in reserves will result from infill drilling. We cannot define "some." Consequently we don't intend to try and peg what order of magnitude reserves will be increased by infill drilling in the Blanco Mesaverde, but we have these as examples of food for thought for your consideration. The gross section of the Mesaverde is over 800 feet thick. Probably only a fifth could be classified as effective gas pay. Permeability varies considerably throughout the pool. Lenticularity exists. Any engineer, and I emphasize the word "any," any engineer would be hard pressed not to admit that these reservoir conditions lend themselves quite well to the supposition "More wells, additional reserves."

Let's look at it from another standpoint. If we were to assume that just 10 percent additional reserves

would be obtained by infill drilling in the Blanco Mesaverde, we agree with the contentions previously made that 4 BCF per well is a reasonable figure for the ultimate reserves under existing wells on the 320-acre proration units. 10 percent of 4 BCF is 400,000,000 cubic feet reserves; at 44.9 cents -- let's call it 45 cents -- per MCF that's $180,000 per well; deduct royalty, deduct taxes, deduct operating costs, will bring you down in the neighborhood of $145,000 per well for the gas alone. Equate this to what we feel is a reasonable estimate for the cost to drill, complete and connect up a well of $118,000 at this time, which is not too different from what Mr. Derrick had testified to. The difference might be in the completion effort made to complete a well, but that's reasonably close. So you can see from just considering the gas alone, that is profitable. Not real attractive, but if you would then throw in the condensate, which averages 4-1/2 barrels per million cubic feet, now you're talking about a well return on investment that becomes attractive and at 45 cents MCF an average annual rate of return, that does become attractive. So, what we're saying is that just with a 10 percent increase in reserves over what we can see with the present wells

(Reporter's note: Page 271 inadvertently skipped in transcription; text of hearing is intact.)

we think the program has merit and will be a good conservation measure.

Frac techniques: There has been some mention on this by Mr. van Everdingen. Frac techniques are much improved over the frac treatments given wells 20 years ago. Frac treatments today are not only larger but they are becoming more scientifically designed by research scientists to yield the optimum results. This not only could but it will assist in providing more reserves from newly-drilled, cased-through completions.

Another point that we have is that reservoir pressure is now at least in the 600 pound range in the immediate area of existing wells in the Blanco Mesaverde pool, probably higher, like Mr. van Everdingen says. Infill drill wells on the undeveloped quarter section of the existing 320-acre proration unit will encounter pressures several hundred pounds still higher. The point we are making is that such infill wells consequently will IP, initial potential better, and they will clean up better after frac treatment if they're drilled in the next several years at these higher pressures rather than waiting a score or maybe two score years to infill drill when the reservoir pressure will then be much much lower. We make

this contention, of course, on the premise that infill drilling makes good conservation sense, will prevent waste in the Blanco Mesaverde Pool, and this we say it will do.

MR. SWAN: I submit Mr. Giles for cross examination.

MR. PORTER: Any questions of Mr. Giles?

CROSS EXAMINATION

BY MR. BYRD:

Q Mr. Giles when you referred to recovery of $145,000 from the gas well, 45 cents, you didn't discount any?

A No, I did not.

Q It would be less than that if you discounted it 8 or 15 percent?

A Right, and you would do the same for the condensate which is additive to that dollar figure.

Q Now, you made a statement at the concluding of your testimony that indicated to me that you thought that if these wells were ever going to be drilled that they'd have to be drilled in relatively short future while the pressure in the rock is still sufficient to return to flat fracture, is that correct?

A Yes, I did say that.

Q Haven't there been some wells fraced in the Texas portion of the Hugoton Field where their bottomhole pressure was down to 150, 200 pounds?

A Oh, yes.

Q Were those frac jobs successful?

A In their own way they were successful, but they would be more successful if there was more zap, more pressure in the reservoir. That's the point I am making. Let's take advantage of what we have in the reasonably near future and not let the pressure get so low that there isn't enough zap to give you a good clean-up effort after a frac treatment.

Q You talked also about the new wells coming in at a high pressure. Now I know you don't operate a gathering system in this field. Do you see any problems about the ability of the high-pressure new wells feeding into a gathering system and a reluctance on the part of the operator of the gathering system to bring the pressure down so it would accommodate the old well?

A We don't see any insurmountable problems on this, no.

MR. BYRD: Thank you, that's all.

MR. PORTER: Anyone else? The Witness may be

excused.

MR. CAMPBELL: Mr. Chairman, it will take a few moments for us to get our Exhibits numbered.

MR. PORTER: We will take about a 10 minute break.

(Whereupon, a 10 minute recess was held.)

MR. PORTER: The Hearing will come to order, please. The Commission will recognize Governor Campbell at this time representing Southern Union Production.

MR. CAMPBELL: Thank you Mr. Chairman. We have one witness.

(Witness previously sworn.)

SUDESH ARORE

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

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Sudesh Arore.

Q Where do you live, Mr. Arore?

A I live in Dallas, Texas.

Q By whom are you employed and in what capacity?

A I am employed by Southern Union Production Company in the capacity of Manager of Reserves and Evaluation.

Q Would you give to the Commission a brief summary of your educational and professional background and experience, please?

A I graduated with a B.S. Degree in Mathematics from the University of Kashmir in India in 1958 and in 1961 I got my B.S. in Petroleum and Natural Gas Engineering from Texas A & I and 1965 I got my Masters in Petroleum Engineering from Oklahoma University.

Q And then you became employed by Southern Union Production Company?

A That is correct.

Q What positions have you held with Southern Union Production Company?

A Well, I was employed by them as an Exploration Engineer in the beginning and from there on I climbed to Petroleum Engineer and eventually Staff Engineer and now Manager of Reserves and Evaluation.

Q And in your present capacity of Manager of Reserves and Evaluation would you briefly describe your duties and responsibilities?

A Well, my current responsibilities are calculation

of all Company oil and gas reserves, supervision of all secondary recovery projects, acquisition and sale of oil and gas properties and evaluation of all building prospects that we undertake in the Company.

Q In connection with your present responsibilities, have you had occasion to examine the situation in the Blanco Mesaverde Pool in New Mexico?

A Yes, sir.

Q Does Southern Union Production Company have interest in that pool?

A We have interest in 78 wells of which 58 we operate and also we have varying interests in several units in the Basin.

Q Have you had occasion recently to make particular studies of certain wells in the Blanco Mesaverde Pool?

A Yes, sir.

Q Mr. Arore, I would like to refer you to the isobaric maps on the wall that have been marked SUPCO Exhibits 1, 2, and 3 and ask you if you will please state what those are.

Q Well, I have taken three townships which are in the Mesaverde Pool and taken 70 shut-in pressures, deliverability, and the cumulative production for those

wells in those townships from 1973 Engineering Program of the Industrial Commission and on the basis of those seven-day shut-ins I have drawn isobaric maps in those three townships.

Q What do those maps -- excuse me -- I notice on Exhibit 3 there are some wells which are circled in red. What is the --

A (Interrupting) Those are the wells which we operate in that particular township. We also have an interest in 29, 7, and 38 just happened to lie between those townships.

Q Would you refer to those Exhibits, starting with Exhibit 1, and advise the Commission as to what those reflect in your opinion?

A Well, all these three exhibits really at this time represent the shut-in pressure in those wells and all the wells in the Mesaverde Basin had initial shut-in pressure of 1000 to 1050 psi, and now the pressure in these wells, which I made a study of in this particular township are considerably lower in most parts and higher --- not higher -- in the range of 800 pounds. To me it indicates that drainage is occuring in this reservoir at this time or generally effective proportions

to recover the reserves that underlie these wells. There really are no such anomalies to indicate that some areas of these three townships have not been drained effectively or have got too many reserves. I think the density of current wells the reserves that have been developed underlying these wells can be drained -- of course I'm not making any prediction about the time, which would be a long time -- but they can be produced in the long run.

Q Do you consider that these areas that you have used, these three townships are reasonably representative of the situation in the Blanco Mesaverde Pool as a whole?

A Well, I have not drawn any other maps in the Basin, but going to pressures which I have seen in the New Mexico Engineering Report, these pressures that represent the range that we have in the Basin.

Q Now, Mr. Arore, I would like to refer you to SUPCO's Exhibits 4, 5, and 6. Mr. Arore, it appears that each of these Exhibits is on a different well, but it represents a process which you pursued in your examination, is that correct?

A That is correct.

Q Would you please state for the Commission, in general terms first and then we'll discuss each of the

exhibits, what it is you did to develop this particular graph.

A Exhibit No. 4 is a pressure build up curve in Nordhaus No. 5 in Section 12, 31 North, 9 West. This well was shut-in for 31 days and the pressures, bottomhole pressures were obtained to the plot in this curve. The curve was made to determine the bottomhole reservoir, depletion in the reservoir and the reservoir conditions. I extrapolated the pressure in this well on the state line portion of it and taken it to an infinite time of shut-in and this shut-in or studies of the well pressure comes to 596 psi. This well, as I stated, has deliverability of 990 MCF per day.

Q Is that what you would consider to be a good well in Blanco Mesaverde Pool?

A Now this is one of our good wells and that's why I considered it.

Before I go to the next page, I determined the readjustment time in this well which is the time for the transit drainage to reach its ultimate boundary or radium, and in this case the radius I'm talking about is 2100 feet, and that readjustment time computes to be about 500 days, which means transit drainage reached the

radius of the 320-acre unit in this particular well in 500 days and that is just about infinite time because you just can't put a number on it. So the pressure of 596 pounds is the static reservoir pressure at the boundary of 2100 feet.

On page 2 I constructed the pressure-distribution curve which is the logarithm distribution of the pressure in the reservoir and it states the radius in feet on a horizontal scale and the pressure on the vertical scale. The summary of the competition is on the last page of this Exhibit.

Q What does that summary reflect?

A This well had initial reservoir pressure of 1900 psig. Incidentally, this well was drilled in 1959 --

Q (Interrupting) I believe that's 1009 psig?

A Yes. (Continuing) whereas some wells around this well were drilled in 1952 and those wells have pressure of approximately 1100 psig. When we drilled this well we could see the drainage occurring even at that time in this particular area. The cumulative production of this well to the time of shut-in was 5.89 billion cubic feet of gas. Now, from this reservoir pressure which I have mentioned, 596 pounds, I computed my average

reservoir pressure and that average reservoir pressure was computed by well-known Matthews-Brauns-Hillsbrook method. Now, assume this well will have an abandonment production rate of 20 MCF a day as an economic limit and a flowing pressure of 50 psig. From original flow equations upon steady state, and a total stature of .75, I computed that abandonment pressure in the reservoir would be 103 psi at that abandonment producing rate. Now, if we have a well on 160 acres in this particular area, which is then the heart of the San Juan Mesaverde Pool, we will have a pressure of 580 pounds at a radius of 1489 feet, which is the radius of 160 acres. That is, incidentally, derived from a pressure distribution curve. Again, by the same method which we have used we got average reservoir pressure of 395 pounds, and using the same conditions of abandonment, the reservoir pressure with two wells in this 320-acre unit will be 91 pounds, so essentially, in a area which is, it seems to me, producing at 991 MCF per day deliverability and abandoned at 50 psi flowing pressure, 20 MCF a day abandonment rate, we will essentially reduce abandonment pressure by only 12 pounds and that is because of the extensive drainage and communication in this particular

area or well. Now, I have computed with ultimate recoverable reserves in this well, at an abandonment of 103 psi to be 8.75 billion cubic feet of gas, and with two wells on 160 that comes to 8.92 abandonment being at 91 pounds. That is increased about 2 percent in an area which is being drained right now very well.

Q Now would you refer to Exhibit 5 and identify what kind of an area this is and the general nature of this well?

A Exhibit No. 5 is Jicarilla G-5 in Section 12, 26 North, 5 West. This well has a deliverability of 397 MCF a day. This well was shut-in on July, 1973, for 37 days --

Q (Interrupting) 1973?

A Yes. (Continuing) For 37 days to see who can make the study of a long time, before the Application even, 37 days and going through the same procedure which I outlined in the earlier exhibit and all the calculations which I don't think I have to explain again. I arrived at ultimate recoverable reserves under this well of 3.7 billion cubic feet and with two wells we can expect to increase the reserves in this well in this 320-acre unit by 4.6 percent.

Q Do you believe on your Exhibit No. 4 and Exhibit No. 5 , the first two wells, that this increase in recoverable gas reserves is substantial?

A Not so far.

Q What do you mean, "Not so far"?

A 4.60 percent is not very good. All these wells which I have made a study on are the ones owned by and operated by Southern Union and that is the only way we could get information on these wells because we had least number of wells.

Q Now, would you refer to SUPCO Exhibit 6 and advise the Commission as to your findings on that well. First, is it a well in the better-than-average or worse sections of the reservoir?

A I didn't follow your question, excuse me.

Q Is the well you're going to refer to in Exhibit 6 in the best, the average, or the poorest part of the reservoir?

A That was one of the reasons for picking these three wells. From 900 MCF, a high deliverability, 300 something, and now, Jicarilla A-14 with a deliverability of 241 MCF per day.

Q So you consider those cover the range from the

better wells to the poorer wells in your areas of production and the areas these show?

A Yes, they do, and at the same time not, because we have some wells on the fringe of this Basin pool where some of our wells are only producing 35 to 40 MCF per day deliverability, and --

Q (Interrupting) Then you did not take the very poorest?

A I did not, that is correct.

Q So let's refer to Exhibit 6 and advise the Commission what the results were with regard to that poorer well.

A Exhibit No. 6 with computations from the build-up curve and other data shows an increase of reserves from 23.3 percent with additional well in this particular area. I estimated ultimate recoverable reserves in this well on 320 acres to be only 660 million cubic feet and they will increase to 814 million cubic feet on the drilling of another well. So we see a very varied range of increased recovery in these three particular wells which necessarily do not take the whole range of deliverability that we have in our wells, and that would mean that the well on the fringes of this pool when

drilled will increase reserves substantially percentage-wise, but in absolute numbers the recovery will still be less than desired for an economic acceptance.

Q Now Mr. Arore, will you refer to what has been identified as SUPCO Exhibit 7. In connection with your responsibilities as Manager of Reservoir and of Reserve and Evaluation, is it your responsibility to make evaluations of the economic feasibility and wisdom of drilling wells in the Blanco Mesaverde Pool on your acreage? Is that part of your duties?

A That is correct.

Q Then, will you refer to Exhibit 7 and advise the Commission what this reflects.

A Before I go further I will persist in saying that this economic evaluation is based upon the recoverable reserves of the wells that are owned and operated by Southern Union because I did not study the whole Basin, the whole pool, and Southern Union has 78 wells, as I mentioned, and we have 2.8 billion cubic feet of gas recoverable under average conditions per well, as a result of that recovery. And so far we have produced over the last 20 years approximately 1.3 billion cubic feet of gas per well. That would give us remaining reserves

of 1.5 billion per well in this pool. I have, for these evaluation purposes, increased the reserves by 11 percent of initial-ultimate recovery. In other words, from 2.8 it is now 3.1 billion cubic feet of gas, and that is, as mentioned, an increase of 11 percent.

Q How did you arrive at that?

A Well, that was really not arrived at by any mathematical genius; it was just considered average because of the range we have seen in the three particular wells which I have alluded to.

The production rate which I have assumed, and we will get the averages, is 310 MCF per day per well, and it has been declined at the rate of 7 percent per year to depletion at abandonment rate of 20 MCF a day. Now, on Table 1 is the basis as it is now; one well on 320 acres. If we start with 310 MCF per day we will deplete the reservoir in 39 years. On this Table 1 I have used 8-1/2 percent net revenue interest to get my gross revenue, price cost computed on 24 cents an MCF plus a BTU adjustment of 1150 BTU per cubic foot at 14.73 psi and tax reimbursements, with escalation of 1/2 cent per MCF per year. Now, this average well of 310 MCF per day would yield net-operating revenue of $382,000 over the

life of the profit of the well, average out, without discounting of course.

On Table No. 2 we have two wells. Well No. 1 being the existing well and Well No. 2 the new well. For this particular table the production rate was increased from 310 MCF per day to 540 MCF per day because of the accelerated withdrawal of gas. I simply allocated those production rates -- we can produce them any way you want to -- but I did it on equal basis for the two wells. In other words, each well will share equally in 540 MCF per day.

Now, for Well No. 1 we'll continue to receive 24 cents an MCF plus escalation, plus adjustments, while Well No. 2 will give us 43 cents an MCF plus the usual adjustment and escalation.

Q And you used 43 cents on the second well in these calculations?

A That is right.

Table No. 3 shows the revenue from Well No. 1 and Well No. 2 to be $622,000 approximately and for Well No. 1, if we don't drill another well and continue to produce at the rate and the prices, $382,000. Incidentally, the life of the reserves will decline from 39 years to 25

years if we drill another well on this average unit, so we will get a net increase of revenue of $240,000. The cost of drilling a new well we have estimated to be $154,000, and that will yield a rate of return of 7 percent. You will notice I did not put any revenues but oil. It is just a matter of -- because I am working to increase the net revenue and we have increased up almost 300 million cubic feet of gas, that would give us at 3 wells per million will give us 900 wells of increased condensate of oil over the 25 years and I should have put that one in there but this was very very small to make any significant change in the final rate of return.

Q That 13 percent, I believe, is indicated on Table 3 as before taxes?

A That is right.

Q In the work you do for Southern Union Production Company and in your recommendations to the Company with regard to their drilling programs, would you consider 13 percent return before income tax to be an investment that you would recommend the Company to make?

A No, sir, not at 13 percent.

Q Do you make evaluations for your Company in drilling wells in other areas?

A I do.

Q Including gas wells?

A Gas wells, oil wells, all kinds of wells.

Q In the work you do are you acquainted with calculations that you have made, or have you made calculations on other prospects in either the San Juan Basin or elsewhere in New Mexico that would provide a better return to your Company?

A Yes, it would.

Q Could you state briefly where those might be?

A Well, for that matter, we have this year discovered lots of new reserves in southeast New Mexico, and we were fortunate in the development of the Morrow pay over there and the prolific development in the Cisco Canyon Reef with more than average reserves and better than average prices. And we also this year have plans to drill wells in the San Juan Basin in the Picture Cliffs to develop new reserves which I think will be higher return and better rate on our investment.

MR. CAMPBELL: That is all the questions I have, Mr. Chairman.

MR. PORTER: Do you want to offer your Exhibits?

MR. CAMPBELL: I would like to offer SUPCO's

Exhibits 1 through 7 please.

MR. PORTER: Any objection to the admission of these Exhibits? If there is no objection the Exhibits will be admitted.

(Whereupon, SUPCO's Exhibits Nos. 1 through 7 were admitted into evidence.)

MR. PORTER: Any questions.

CROSS EXAMINATION

BY MR. MORRIS:

Q Mr. Arore, can you tell me how you happened to pick the three townships that you did for your Exhibits 1, 2, and 3?

A On 31, 9, we have approximately 14 or 15 wells in that township and we have interest in 29, 7 and I was just trying to make a study in the middle of the pool and to be contiguous, 38 was in the middle of it.

Q As I understand what you did here, you took the 7-day shut-in pressures for the year 1973 and for that period only in preparing these Exhibits?

A Yes, sir.

Q Did you make any study of what these pressures would look like if you had stepped back in time a year or two or five?

A No.

Q Did you give any consideration in preparing these Exhibits to the long-term build-up tests that were conducted by El Paso Natural Gas Company on the 38 wells that Mr. van Everdingen testified to and that were marked on El Paso's Exhibit 14?

A I didn't have access to those pressure build-ups.

Q Well, those pressure build-ups, that information is a matter of public record here at the Oil Conservation Commission. Did you consider those?

A I was not familiar that it was a matter of public record.

Q Did you consider the pressures that were available with regard to the three strat tests that were conducted by El Paso.

A I am afraid that I was not familiar that they were a part of the public records.

Q Has Southern Union Production Company conducted any long-term build-up tests in the Blanco Mesaverde?

A The tests which we have conducted are the ones in evidence over here. These three tests ranging from 31 days to 87 days. That is the only long-term we have conducted.

Q How many of those do you have?

A The three which I have just -- Nordhaus 5, Jicarilla 14 and Jicarilla G-5.

Q Concerning the Nordhaus No. 5 Well in 31,9, Section 12, just from an observation of the reserve pressures, would you agree that those pressures shown on your Exhibit 4 would appear to be extremely low pressures for the Blanco Mesaverde Pool?

A Which one are you talking about?

Q I'm talking about Nordhaus No. 5.

A That is a shut-in pressure of 308 pounds; isn't that the one, 308 pounds?

Q Yes, that's considerably lower than the pool average is it not?

A It is lower because it is draining the area, and that is why it is lower.

Q Are you satisfied, Mr. Arore, that this is a Blanco Mesaverde Well? That this well is completed in the Blanco Mesaverde?

A This system will fit into the Cliff House and the Point Lookout formation and members of the Blanco Mesaverde.

Q Again, still referring to this Nordhaus No. 5 Well,

you show permeability here of 1.1 millidarcy, is that correct?

A That's correct.

Q And you show as part of this Exhibit that this well is draining, in your opinion, over a radius of some 2100 feet?

A Yes, sir.

Q Do you consider that it is effectively draining over that much distance?

A Yes, if you can take into account the net feet of pay -- not a net, this is a gross thickness of 108 feet -- take that into account and calculate the reserves on 320 acres and bring the pressure that we had of 1009 psig and the porosity of 10 percent, which I have listed over there, you would get recoverable reserves on 320 acres of approximately 7-1/2 to 8 billion. This is what the pressure decline showed on this particular well.

Q How long a life do you give to this well? How long would it take to substantially deplete these reserves?

A Well, I have not worked exactly on this well; I have worked on the basis of an average well, and that comes to about 40 years from now on.

Q All right. Now, you said a minute ago that this was a below average well, at least as far as its pressure was concerned, so, it being a below average well, do you have any feel for how long it would take to effectively deplete the reserves that you attribute to the well?

A Well, this well is a pretty good well; I would have to establish the decline rates for this well then find out exactly how many years it is going to take and I have not done that.

Q Does this well produce into the Southern Union gathering system or the El Paso system?

A Southern Union.

Q Do most of the wells, or perhaps all of the wells of Southern Union Production Company produce into the Southern Union system?

A That's right, sir.

MR. CAMPBELL: Just a moment, please. He said, "All or almost all." Would you --

MR. ARORE: I said all of them, all those we operate, and of course, the other ones in 29,7 go to Northwest Pipeline, but the ones we operate we produce into the Southern Union system.

BY MR. MORRIS:

Q Are you familiar with what the gathering line's pressure is off the Southern Union line under which this well is produced?

A I'm not sure, but I think it is 250 pounds.

Q Have you made a study of the geology of the Mesaverde formation?

A I have looked at all the logs which are available to us in the wells we operate and have interest in and I have worked with them considerably but I have not as per se drawn a geological map, but I'm familiar with the formation, it's geologic time in history and everything, but not in maps -- I have not made any maps.

Q Have you prepared any cross sections or attempted to relate the producing zones from one well to another of the wells that are operated by Southern Union Production?

A No. We have not done that in that in the sense because this wells has got, as we opened every feet of pay, that we have seen the thing, and in this particular well it seems like it's draining and we have not made any cross sections for any area.

Q How many feet of net pay do you attribute to this

particular well?

A I just don't have any idea what net feet of pay is in this Mesaverde because we just don't know what effective permeability is in this pool or what the cut-off is going to be. This 108 feet that you have mentioned is the gross pay which has been perforated but that does not necessarily mean that that pay is all effective. Now, the permeability of 1.1 millidarcy is based on 108 feet of pay, but that is not effective permeability for those 108 feet of pay. There could be only 50 feet of pay contributing to this well and have a lot higher permeability than 1.1. So, it is really hard to take 3, 400 foot of section which has been opened and take some arbitrary cut-off and say that we have got so much net feet of pay. It isn't possible, not in this kind of reservoir oil.

Q Now, in your analysis of the logs, you attempted to correlate the producing zone from one well to the next so far as your wells are concerned to see if they're producing from the same zones or lenses?

A How can you tell they're from the same zone? All you have to do is -- we have got certain wells on the fringes in which we have opened more than 100 feet of pay and 100 holes in them, and still, in spite of

stimulation, they're making only 50 MCF per day, so that gas in the lenticular area which you are talking about. In spite of the fact we are producing in 100 feet of pay it is only making 50 MCF per day, so that leads to the conclusion that most of the gas that is coming in this Mesaverde is coming from the thick sections and those lenses, 1 to 2 foot lenses, are not contributing to any reserves or to deliverability.

Q How many feet of pay do you have opened up in this particular well?

A 108 feet of pay. That is the pay which I have used over here, is the pay in all of the exhibits which I have mentioned, is the one that has been opened, you know. For example, I will refer you to Jicarilla 14. We have got 88 feet of pay open in that well and we have made only 58 million stimulated and have got deliverability of 221 MCF per day, so that feet of pay that we opened, we opened everything that we can see in these wells of the logs and what they tell us in the way the possibility of gas may be, but that doesn't necessarily translate into deliverability of reserves; I have seen that.

Q Do you agree or disagree with the lensing

phenomena that was described by Mr. van Everdingen?

A I agree with saying they are lenses, I cannot deny that, but that is the logical phenomena, and it does exist over there, but the importance that you are attaching to that phenomena I think is somewhat exaggerated and it may be exaggerated in the middle of the pool where your reserves and deliverabilities are above the average range.

Q With respect to this Nordhaus No. 5 Well, you say that that well, that if an infill well were drilled on that proration unit it would only increase recoverable reserves by 2 percent, is that correct?

A That's right.

Q And your opinion in that regard is, I take it, based upon your interpretation of what the contributing effect of the lens would be?

A I have not taken into account --

Q (Interrupting) Well, the failure of the lenses to contribute --

A (Continuing) Right, I have not taken into account any increased reserves because of lensing over there.

Q Now, getting away from the lensing effect, do you recall Mr. van Everdingen's testimony this morning

concerning the importance played by the changes in lithology; that is the changes in porosity and permeability and the -- to use his expression -- the cruddy sands mixed in with the good sand. Do you agree or disagree with the existence of that phenomena and its importance with regard to the existence, the availability of increased reserves?

A Do you refer to the phenomena in a particular area or the whole pool?

Q Well, let's talk about it in the area of this Nordhaus No. 5.

A Well, in that area, the production rates we have and with the deliverabilities that we are getting, and permeability which I have come up with, 1.1 millidarcy or 108 feet, and higher for less feet, it doesn't seem to have any effect. But it does have a lot of effect, a lot of credibility when you go away from those good producing areas.

Q So again, the existence of additional recoverable reserves is based upon whether you have the lensing effect, whether you have the changes in lithology, and the importance that you accord to those, and you're saying that these should be accorded very little importance

in the heart of the field.

A That is my opinion considering what some of these wells have produced, what pay they have, or what deliverability they had; I don't think that lensing has much to say in that area.

Q All right, as you move out away from the heart of the field, then you would expect to see greater and greater increases in recoverable reserves.

A This is what I have shown from my three build-up curves, or the analysis, that when you are going away from the heart of the Blanco Pool, the reserves are higher, deliverabilities are higher; you are going to increase the reserves percentagewise substantially, as much as 25 percent, in the Jicarilla 14 area, but that will be due to, I'm not sure due to lensing, but due to the drainage of additional 160 acres, because, as you go away from the heart I recognize it is hard to drain 160 acres considering the permeability of .1 millidarcy or less than that and having 108 feet of pay, and not contributing anything in terms of reserve, you are going to increase reserves on 160. But, it is just a matter of how much again.

Q I don't mean to belabor it, there may be a good

explanation for it, Mr. Arore, but I'm still concerned about the low pressures on this Nordhaus No. 5 compared to the pressures that you show on your other build-up curves. The pressure on your Nordhaus No. 5 shows it starts building up at below the 300 pounds bottomhole pressure which would indicate a wellhead pressure of something even lower than that.

A That's right.

Q And I am --

A (Interrupting) Excuse me, that pressure was taken in 1973 and this build-up was made in July of 1974, one year later.

Q All right, but I'm concerned whether you have compressor on this well, or whether the line pressure was -- you did have a compressor on this well?

A There is compressor in the area.

MR. MORRIS: I think that's all.

MR. PORTER: Does anyone else have a question of the Witness?

MR. BYRD: I have one question.

MR. PORTER: Mr. Byrd?

CROSS EXAMINATION

BY MR. BYRD:

Q Mr. Arore, referring to Exhibit 7, was there any reason why you allocated the production equally between the two wells?

A I got the idea from Mr. Derrick. You can do it any way you want to, but that is the way I did it.

Q If this should be --

A (Interrupting) I should have put more production in the No. 2 Well than the No. 1 Well because you are going to be in an area with a little more high pressure, but my feeling is that the reserves are being depleted at sufficient rate that when it will affect a well, eventually, not a very long time, your withdrawal rate should be the same to effectively drain your 320 acres.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Arore, on your Exhibits 4, 5, and 6, I just have a couple of questions I would like to ask you?

A Yes, sir.

Q On Exhibit 4, the Nordhaus Well, when was that well drilled?

A In '59.

Q What is the current deliverability?

A 991.

Q And when was that deliverability test taken?

A That's last year's deliverability. It was taken on April the 10th, 1974.

Q Okay, now on the Jicarilla G-5, when was it drilled?

A 1969, September '69.

Q '69?

A Yes.

Q And what is the current deliverability on this?

A 397 MCF a day.

Q When was that pressure taken, or that deliverability taken?

A It was taken on June of this year.

Q And the A-14?

A It is a recent completion; it was completed in 1973, and the deliverability is 200 MCF a day; initial deliverability.

Q 1974?

A Yes, initial.

MR. NUTTER: Thank you.

MR. PORTER: Does anyone else have a question? The Witness may be excused.

Mr. Carpenter, would you call your witness, please, sir?

(Whereupon, a discussion was held off the record.)

MR. PORTER: We'll take about a 10 minute break to give our Reporter a little break.

(Whereupon, a short recess was held.)

MR. PORTER: The Hearing will come to order. The Commission will recognize Mr. Carpenter of Southern Union Gas Company.

MR. CARPENTER: We have one witness, Oran L. Haseltine, who was sworn in yesterday morning.

(Witness previously sworn.)

ORAN L. HASELTINE

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

DIRECT EXAMINATION

BY MR. CARPENTER:

Q Mr. Haseltine, would you state your full name for the record along with your business address?

A My name is Oran L. Haseltine; I work for Southern Union Gas Company at 1400 Fidelity Union Tower, Dallas, Texas, 75201.

Q And in what capacity are you employed by Southern

Union Gas Company?

A I'm Vice President in charge of gas supplies.

Q Would you give us a little idea of your responsibilities in that position?

A My responsibilities run to the obtaining on both short-term and long-term basis our gas supplies for our utility business, and for making sure that our supplies are adequate, that we have adequate deliverability, matching those supplies on a long-term basis with long-term requirements, and then, of course, involved with that are the matters of prorationing, evaluation of new areas for prospective new purchases, and such matters generally related to gas supply.

Q Mr. Haseltine, would you tell the Commission a little about your background and experience.

A I'm a Graduate Engineer from the University of California. I worked approximately 8 years with Signal Oil and Gas Company as a Production and Petroleum Engineer in the West Coast and in mid-continent. In 1958 I went to Farmington as Drilling Superintendent for Southern Union Gas Company; since that time I have worked in various jobs for Southern Union both in production and exploration and in gas supplies. I have been in Dallas

since 1961.

Q Do you have experience and familiarity with the Blanco Mesaverde Gas Pool?

A Yes, both as initially Drilling Superintendent in the San Juan area, the first year I was there we drilled a number of wells, including the wells drilled in the Mesaverde, and then since then, of course, in proration matters and reserve calculation matters, generally all of the matters relating to the maintenance of the underground inventory.

Q Have you ever testified before this Commission before?

A Yes.

MR. CARPENTER: Mr. Chairman, we submit his qualifications to the Commission.

MR. PORTER: The Commission considers the Witness qualified.

BY MR. CARPENTER:

Q Now, Mr. Haseltine, briefly, but not in detail, would you state the interest of Southern Union Gas Company in the subject matter of this Hearing?

A Our interest arises out of three areas primarily: First of all we are purchaser both in our own name of

Southern Union Gas Company and through a wholly owned subsidiary; secondly, we're transporter in that we gather and transport gas to the market areas; and our third interest arises out of our position as a public utility in northwest New Mexico under the jurisdiction of the Public Service Commission in a good many areas. As a public utility we feel that we have some obligations to render reasonable service, adequate service and at just, reasonable rates. These are the basis for our interest in this Case.

I might add in addition to that that the San Juan Basin in total, the Mesaverde as a part of that, serves as a major source of supply, virtually the total source of supply, for a half million people that depend on our gas supply in northwest New Mexico.

MR. CAMPBELL: Mr. Chairman, I would like to raise the same objection to testimony concerning the market situation of Southern Union Gas Company and its obligations to its purchasers, consumers, on the same grounds on which I objected to El Paso Natural Gas Company's testimony.

MR. CARPENTER: Mr. Chairman, I believe the question asked the Witness to recall the nature of his interest

in the subject matter hereof. We are not directing this to market demands; maybe Counsel is anticipating whether we may or may not go later, but I think the Southern Union Gas Company is entitled to testify on the record of why it is here so in the event an appeal for the proceeding is necessary or desirable, the basis of the interest of this participant is noted in the record and can withstand any challenge from someone else to appeal as to the standing of Southern Union Gas Company to be there. This is what we are trying to establish: The nature of our interest in being here today.

MR. CAMPBELL: Mr. Chairman, reserving by privilege to object at the time that any evidence is offered to substantiate the statements that are now being made, I'll withdraw my objection at this time.

BY MR. CARPENTER:

A (Continuing) What I was saying was that because of the service that we render to a half million people in this area, and the fact that we have depended on the producers in the San Juan Basin to supply the gas for this area, this constitutes one of the fundamental reasons for our interest and one of the reasons we are here to bring some of the facts before the Conservation

Commission in this issue.

Q Now, Mr. Haseltine, have you studied the El Paso proposal in this Case and been present during the prior testimony in this Hearing?

A Yes, sir.

Q What do you understand, for the basis of your remaining testimony, to be the gist of El Paso's proposal?

A We understand the thrust of this proposal to go in two directions: One, it's a change in spacing, and two, it's a change in formula. We understand further from the findings which El Paso made that the purpose of their filing is to meet the market demand on their system.

Q Now, Mr. Haseltine, have you compared this new allowables formula to the existing allowable formula, and if so, what do you conclude?

A Yes, I have compared it to the existing formula. First of all, the formula that we have, which prorates some 2000 wells in the Mesaverde Pool is a formula that's based on acreage deliverability and it's a formula that has been in existence for about 20 years. The formula has obviously worked well and without general hardship during that time. The existing formula we feel has protected correlative rights and has prevented waste over the

years, and therefore we feel that any change in that formula may or may not continue to protect correlative rights and prevent waste. We feel that it is a substantial change in the formula.

Q Would the granting of the El Paso Application result in the production of natural gas from this pool in excess of reasonable current requirements for current consumption and use within and outside New Mexico, together for building or maintaining reasonable storage?

A Yes.

Q Would you please explain your answer?

A The question really is in two parts. You've asked about the requirement for consumption and use within and outside New Mexico.

First of all, the market in New Mexico, including storage, is adequately served. Any production in excess of current production necessarily would be in excess of that market requirement.

The market outside New Mexico is adequately served if we consider the high priority requirements of the outside market. If you include the short-term, low-priority service to be rendered by displaced production, well then, "No," that market is not being served. We do

not believe that that is a reasonable market to be served by double drilling the Mesaverde pool.

Q Would the granting of the El Paso Application provide for the allocation of the allowable production among the gas wells in this pool, delivering gas to a gas-transportation facility upon a reasonable basis and recognize correlative rights?

A No, the allocation would not be on a reasonable basis.

Q Would you please explain that answer?

A Well, as we mentioned before, we have an existing formula which considers acreage and deliverability and it has worked for 20 years. The new proposal is a different formula and is a fundamental change in the treatment of acreage. Historically short-acreage units have been penalized proportionately to their short acreage and in today's proration schedule of the Mesaverde unit you will find wells that are penalized down to as much as .62, that would be 62 percent, of the allowable that would be granted to that well if it were on a full 320. There are many short-acreage wells in the Mesaverde pool. The formula that has been proposed would, insofar as the AD portion of the allocation is concerned constitute a double dip on

acreage.

Q Mr. Haseltine, does the proposed double drilling program of El Paso give each producer equitable opportunity to drill their second well on each 320-acre unit?

A No, we don't think so. First of all, we've heard some testimony on that today, and we also feel qualified to speak to this point although we're not a producer. But, in the function of obtaining gas supplies for Southern Union Gas Company we are in constant communication with producers, both in San Juan Basin and other places, and we have some knowledge on a first-hand basis of their problems.

All of the producers would not have an equitable opportunity to drill a second well because of the shortage of drilling contractors, shortage of casing equipment and shortages of crews and other supplies. Those that could drill, and who were given the opportunity as we understand under the proposal to shift their production to the new well, would enjoy a 43 cent price plus the adjustment, while those who could not drill would be restricted to the 24 or 28 cent price plus the adjustments.

Q Assuming that 699 applied to the second well, sir?

A Yes.

Q Now, Mr. Haseltine, would the granting of the El Paso proposal prevent, insofar as practicable, drainage between producing tracts in the pool, which is not equalized by counter-drainage?

A No, the effect would be contrary to that and to the extent that some locations could be double drilled and some could not, drainage not countered by off-set drainage, would be incurred.

Q If the double-drilling proposal and the new formula were to be approved by the Commission, would there be any economic loss caused by drilling of unnecessary wells?

A Yes, there would be.

Q Would you please explain that answer?

A Well, we'd take a piece at a time to the participating producer who would drill his second well and add virtually nothing to his inventory on the shelf, to the reserves that he has. I think that the current full-cost accounting system that was used by most producers would very adequately and powerfully demonstrate that he has suffered some loss. On the full-cost accounting method, if I understand it correctly, he recovers his cost of capital investment over some period of time as the units

of production are produced. By doubling this capital investment and by adding little or nothing in most instances, certainly in the first few wells, to the inventory on the shelf, this full-cost accounting method would demonstrate that he's got the same number of production units to recover twice the capital cost. The producer who also would go ahead and participate in this program, would have to make a decision whether or not he is not in fact running gas today at a lower price, even under the 43 cent provision of 699, that he might get one year, two years, three or four years down the road from now. So, the participating producer might well find that even as has already occurred in the past, that the present worth of his income would have been greater had he delayed a year or two and achieved a higher price. The nonparticipating producer would be harmed because he of course would be confined as I understand it to the old price. He would be in jeopardy of drainage.

We further believe that there is some implied covenants in most leases that require him to drill or to forfeit acreage. This is a risk that he would have to evaluate.

The purchasers would be harmed and would suffer

economic loss through the drilling of unnecessary wells because the purchasers would have to connect those additional wells. Generally it is about a $25,000 expenditure for us to connect a Dakota or Mesaverde well. Now, that does not include trunk lines; that's merely lead line, meter run, dehydrator, that sort of equipment.

The users are going to have to pay for that ultimately. That additional investment in capital facility has got to be recovered someplace, so the user is going to have to suffer an economic loss.

Royalty owners, taxing authorities and generally the economic community are going to suffer if premature depletion, if misues, unwise-rapid completion occurs in the Mesaverde pool.

Q Have you reached any conclusions as to the appropriateness of double drilling in terms of timing?

A Yes, we have. We feel that double drilling is not appropriate now. we think that double drilling today would run to the benefit of some high-volume consumers on a short term. We think that the long-term benefits would be violated, the long-term benefits to most consumers of gas would be violated by a premature double drilling of the Mesaverde. A delay will solve the pricing problem

and ought to go a long way toward alleviating the shortage of casing and rigs.

We think that the capital that would be invested by the producers in drilling these wells ought to really go, at least in large measure, to the development of new reserves, exploration, and the finding of new inventory for the long-term business. We think that this is what the higher prices being paid for gas are all about. We've heard, and we've testified and we understand that the producers cannot continue to sell gas at 1960 prices and explore for gas at 1974 costs, so we think that those new prices, that ultimately the consumer has to pay, ought to recover some new reserves for that consumer whose paying the bill. We think that that's the thrust of 699.

Q Mr. Haseltine, what effect does double drilling and the new formula have on your utility service for the approximately 500,000 people, you have gas service to homes in northwestern and the Albuquerque Division served from gas produced in San Juan Basin, including from this pool?

A Double drilling at this time would have a negative effect.

MR. KELLAHIN: If the Commission please, as I understand the question it is directed to Southern Union Gas Company's market situation in the State of New Mexico. If that is the thrust of the question, we object.

MR. CARPENTER: Mr. Chairman, I don't think that is the thrust of the question. I think the thrust of the question goes to what is the effect that Southern Union knows as a utility, as a utility in this State, of the granting of the proposal by this Commission upon the half a million people, their livelihood, their environment, their economic well-being, and their health well-being.

MR. PORTER: The Commission has no jurisdiction over such matters, Mr. Carpenter, and we'll sustain the objection.

BY MR. CARPENTER:

Q Now, Mr. Haseltine, do you have anything else you would like to add?

A Well, I think these concepts have to be faced here, this matter of hustling gas for the long range and the choice of where it's to run. I have nothing further.

MR. CARPENTER: That's all I have on direct.

MR. PORTER: The Commission is going to order stricken from the record any references by the Witness

to the adequacy or any inadequacy of the current formula or proposed formula to meet market demands or any reference to priority of use. So, the Witness is now available for cross examination.

MR. CARPENTER: Mr. Chairman, for the record may I state the basis of argument on that?

MR. PORTER: May you what?

MR. CARPENTER: Well, I take it some of my testimony which I'm not sure which it is, was stricken, I would like to state --

MR. PORTER: (Interrupting) The testimony concerning priority of uses over which we have no jurisdiction or whether or not either formula is adequate to meet market -- for the producer to meet market demand. There was some testimony given by Mr. Haseltine on those accounts.

MR. CARPENTER: Mr. Chairman, I think that reasonable market demand for the purpose that it was included in the direct testimony is entirely different from the issues that was faced by the Commission yesterday, and I would like an opportunity to state my reasons why I think it is.

In the first place, referring to the Continental

Oil Company Case at 373 Pacific 2nd, 809, and particularly to 816, page 816 of the decision, the Supreme Court says, and I quote, "When Section 65-313C and Section 65-313C are read together, one salient fact is evident. Even after a pool is prorated, the market demand must be determined since if the allowable production from the pool exceeds market demand, waste would result if the allowable is produced." Now, that is a different issue than what the Commission states yesterday. What the Commission states yesterday was an attempt which the Commission did not allow to increase production because of market demand. What our testimony seeks to do is to come under this language, which says that even if production is otherwise allowable, it cannot exceed market demand or otherwise it is waste, and that is exactly what the Supreme Court says. Essentially we're using this as a cap or a limit rather than an instrument to pry open, otherwise rules prevent waste.

Mr. Chairman, I also call the Commission's attention to Section 63-3E which defines the term waste when applied to natural gas and the definition refers to the production in this State of natural gas from any gas wells or wells from any gas pool in excess of the reasonable

market demand from such source for natural gas the type produced. Then you have a further definition, as the Commission is well aware, of reasonable market demand, and again it goes to reasonable current requirements. Now this Legislature has vested this Commission with jurisdiction to determine reasonable requirements. Now, what we are advocating here, the word "reasonableness" has to have some type of context in which it sets, and what our Witness is trying to say is a context in which the word "reasonable" can be viewed. I think the Commission well knows, as far as the Chairman of the Commission well knows, is the Legislature spoke to this issue during the last session when the House Taxation and Revenue Committee Report on energy matters was unanimously adopted by the House of Representatives. I think the Land Commissioner, who is not here today, is very aware of the State's concern when the Legislature passed HB 441 a few years ago addressing itself to this situation.

I think that Commissioner Trujillo is aware of our States predicament in this regard because of the recent policy statement made by the Western Governor's Conference under the leadership of Governor King in this matter, and I do think there is two different basis for

our testimony: One on the definition of waste which includes the concept of reasonability of use, and secondly, under the Continental Oil Case, which certainly involves testimony, in fact demands testimony of market demand be allowed to be introduced in a prorated pool to set a limit.

MR. PORTER: Mr. Carpenter, the Commission does recognize its responsibility in that area and the Commission has taken care of it. As your Witness is well aware, the Commission does not allow production in excess of market demand as they do not allow any gas flaring or venting from a dry-gas well, so it is well taken care of in other areas of the Commission's activities, so the Commission 's ruling will stand.

Does anyone have a question of the Witness? Do you have any questions Mr. Byrd?

MR. HENSLEY: I've got a question.

MR. PORTER: Mr. Hensley?

CROSS EXAMINATION

BY MR. HENSLEY

Q Mr. Haseltine, what is the present capacity of the Southern Union Gas pipeline facility serving the Mesaverde Pool?

A We have no single pipeline that takes gas out of the Mesaverde. Since all those pools lie on top of each-other,our facility serves all of them in total. The only figure I can give you in total out-haul capacity,which is around to the New Mexico market, is around 303, possibly 310 million per day.

Q What is your present deliverability into that system from the existing wells?

A Statutory deliverability in total would be a matter of adding up the proration record. I don't have that figure with me.

Q Do you have any excess capacity in the line at the present time?

A Not excess in terms of our peak days' demand. We have excess capacity in terms of year-round ability of the pool to produce.

Q I assume then, that insofar as the producers that are connected to your facilities are concerned, should the Commission approve this Application by El Paso, there would be a serious question as to whether or not you would be able to accept delivery of any gas from the twin wells?

A Really, it's not so much a question of accepting delivery as a matter of where we stuff it after we have

accepted it. There is a certain fine-eyed market in northwest New Mexico and we would serve that market to the extent that we were tendered and that we took gas over and above the New Mexico market it would have to be dumped to the interstate system.

Q And that would depend I assume on whether or not El Paso's capacity was sufficiently excess to absorb this difference?

A Well, yes, that's true, but I think that they would have the capacity; I'm not worried about that, I think they would.

MR. HENSLEY: No further questions.

MR. PORTER: Any further questions of the Witness?

Mr. Carpenter, you didn't have any exhibits, did you?

MR. CARPENTER: No, I didn't.

MR. PORTER: If there are no further questions, the Witness may be excused.

Anyone else have anymore testimony to present?

MR. SCHULTZ: Mr. Chairman, may I have a few moments to read a short statement for record purposes?

MR. PORTER: Surely.

MR. SCHULTZ: My name is Frank A. Schultz; my address is 730 Fidelity Union Tower, Dallas, 75201.

Mr. Chairman, by way of introduction, and as a reason for being here to make a statement for this record, I submit that I have been involved professionally with the gas problems of the San Juan Basin probably longer than most everyone present here today. Certainly longer than El Paso Natural Gas Company since they were introduced into the area by a company I represented. Now, as a producer having an economic interest in some 524 wells in the New Mexico part of the San Juan Basin, a good many of which are Mesaverde wells, I have a keen interest in the decision that will ultimately be rendered by this Commission. It is my belief that the evidence presented at this Hearing clearly shows:

(1) That substantial new quantities of gas will be recovered and produced within more meaningful economic time periods with infill drilling.

(2) That this gas may never be recovered without the infill drilling by reason of its variable nature of the reservoir, due to porosity and permeability changes in the formation both vertically and horizontally.

(3) That every operator would be afforded the

opportunity to drill and produce his just and fair share of the gas field, thereby preventing waste and protecting correlative rights.

(4) That the increased income attributable to this new production will be a substantial benefit to the producers, to the State of New Mexico and the Federal Government, and the other royalty owners.

It is my opinion, therefore, that the Commission should adopt the proposed changes set forth in El Paso's Application. I might add, Mr. Chairman, that should the Application be granted, it is my intention to drill all of my locations as soon as drilling rigs and tubular goods are available, whether we are under the new price system or the old price system.

I appreciate very much your giving me this time to make this statement, and I would like to leave this signed --

MR. CAMPBELL: (Interrupting) Mr. Chairman, may I require him to show whether his interests are primarily overriding royalty interests, or working interests?

MR. SCHULTZ: They are both.

MR. CAMPBELL: The majority of them are override?

MR. SCHULTZ: I would say the majority are overrides but a substantial number are working interest wells.

MR. PORTER: Thank you, sir. Mr. Hinkle?

MR. HINKLE: Richfield has requested that I submit the following statement at the conclusion of the testimony.

(Reading) Atlantic Richfield recommends that the Commission include in any amendment to Order No. R-1670 a provision specifying the manner in which individual wells will be produced. Deliverability is part of the present allocation formula. Therefore, it is recommended that when more than one well is completed on a proration unit, the unit allowable be produced from the individual wells in direct proportion to each well's deliverability. In the event one well will not produce its proportional share of the Unit Allowable, the other well will be allowed to produce an additional amount of gas to make up this deficiency. (End of reading.)

MR. PORTER: Mr. Hinkle, do you have a statement for anyone else?

MR. HINKLE: No, we're willing to waive any argument.

MR. PORTER: I see.

MR. KEENER: Robert Keener, of Northwest Pipeline. I would like to make a statement, please.

MR. PORTER: Yes, sir.

MR. KEENER: Northwest Pipeline Corporation is a producer and purchaser of natural gas in the San Juan Basin. Northwest presently gathers and transports 250 to 260 million cubic feet per day from the San Juan Basin for its interstate markets in the Rocky Mountain Northwest area. Approximately 150 million cubic feet per day of this gas is produced in wells in the Blanco Mesaverde gas pool. Northwest has approximately 269,000 acres in the Blanco Mesaverde gas pool which are leased or dedicated by virtue of gas-purchase contracts. It is a matter of record with the Federal Power Commission that Northwest Pipeline presently is in the curtailment situation. With present supplies declining, it is almost certain that the situation will become more severe. Therefore, Northwest's market requirements will more than offset any anticipated increase in availability realized in infill drilling in the Blanco Mesaverde pool on acreage presently dedicated to our system. Northwest's San Juan Basin facilities presently have an excess capacity of 60 to 70 and 80 cubic feet per day. With the continuing

decline of our availability from the San Juan Basin, it appears that we will have sufficient capacity to gather and transport all gas made available to us through infill drilling.

In view of the above, Northwest supports El Paso Natural Gas in its application presently before the Commission to change the rules in the Blanco Mesaverde gas pool as proposed in El Paso's Exhibit No. 1.

Thank you.

MR. CAMPBELL: Mr. Chairman, no argument, just a statement of the position of Southern Union Production Company with regard to the allowable formula proposed by El Paso Natural Gas Company.

We believe that the formula will accentuate the risk of severe drainage and abuse of correlative rights if adopted as suggested, allowing the adding of both deliverabilities to the unit allowable and we urge the Commission, in the event an order is entered authorizing the drilling of additional wells on the 320 acre unit, that each 160 acres be assigned an allowable based on the present formula or, at the most, the deliverability of the two wells be averaged for the 320-acre unit rather than an additive.

MR. BYRD: Mr. Chairman?

MR. PORTER: Mr. Byrd?

MR. BYRD: A short statement regarding the formula. I think, I'm sure this is the first State Commission that has had an opportunity to consider an application such as this since the FPC came out with its national rates. I will agree that reading that order literally it appears that the higher rates would apply to new wells drilled in this pool. I also know from past experience that the FPC has a history of interpreting their orders in order to accomplish what their stated purpose of the order is and I sincerely believe that if El Paso's application is adopted as proposed, wherein they would let the operator decide how much gas is going to be produced in each of the wells on the unit, that it would only be a matter of time before the Federal Power Commission would have to reconsider or interpret their order so that it would not apply to a new well drilled in this pool, the reason being that I'm sure they didn't concentrate on 699 if they could go into an existing developed area and drill a new well and raise your price from 24 cents to 43 cents. I think it behooves the Commission here to try to assist the Federal Power Commission in accomplishing

its purpose, and I think as this Commission stated in its letters to the Federal Power Commission regarding this system you should indicate, if you decide that this Application should be granted, that the granting of the Application is because additional gas will be recovered, because deliverability will be increased, and that you're going to assign allowables to the new wells based on the deliverability of the two wells on the unit. In other words, if a new well comes in and it represents 70 percent of the combined deliverability of the two wells on the unit, then 70 percent of the allowable ought to be assigned to that new well and 30 percent to the old well. I think this would be consistent with what the Federal Power Commission might consider in the future as being consistent with their intent in allowing the price to apply to wells on existing dedicated acreage. Otherwise, I'm sure they are going to exert themselves and reinterpret their language so that we will not have the advantage of the new rate. I know, and I realize that you are going to take deliverabilities in this field with an average on every other year and that the allowables to the well will change down through the production history of the two wells. I

still believe that it would be consistent with what the Federal Power Commission obviously intended in their order if you would provide that the allowable would be assigned on the basis of the ratio of deliverability.

MR. PORTER: Mr. Kellahin I believe was next.

MR. KELLAHIN: If the Commission please, I feel that there is some things that could be argued in this Case. It may take a little bit longer to resolve but I think it is very important that some matters relating to the law be discussed.

At the outset, I am representing Union Oil Company of California, Clinton Oil Company and Amerada Hess Corporation. I would like to read a statement on behalf of Union Oil Company.

(Reading) Union Oil Company, as a royalty and working interest owner, strongly opposes El Paso's application to amend the spacing in the Blanco Mesaverde Pool. We respectfully urge the Commission to reject the proposal because it will violate the correlative rights of royalty and working interest owners and would result in economic waste by the drilling of unnecessary wells, thus consuming valuable rig time, materials, and tubular goods in a time of short supply of those items.

These items could be better used in seeking new reserves. Union interprets the proposal to be simply a device to improve El Paso's short-term deliverability at the expense of correlative rights. Does not the application have the effect of delegating to El Paso and other operators the opportunity to selectively prorate this pool?

The proposal would allow the drilling of a second well on any 320-acre proration unit solely at the operator's option. Unless adjacent proration units are similarly developed, the proration unit so selected for the second well would gain an unfair competitive position. The reason for this is that, by adding the two deliverabilities, the tract would produce more than its share of gas by draining reserves from adjoining acreage due to a higher allowable and having two withdrawal points. (End of reading.) I would like to interpolate here that Mr. Campbell has made a suggestion that the deliverabilities, rather than being added be averaged. Another solution might be to put the well on straight acreage proration formula. I don't think that anybody wants to get into that.

MR. PORTER: Not at 4:20 this afternoon.

MR. KELLAHIN: (Continuing reading.) As this application will serve to temporarily increase production

rates without a corresponding increase in reserves, production decline in other wells will be accelerated.

Since El Paso has not proved that significant quantities of otherwise unrecoverable gas will be produced from the second well, the drilling of the second well results in economic waste .

The requested revision would be unfair in a homogeneous reservoir but this injustice is compounded in a heterogeneous reservoir such as this one. Economics dictate that the second well would be drilled in the more porous and permeable areas of the field. However, correlative rights would be better protected by the opposite, that is drilling the second well in the less porous and permeable areas. The 320-acre spacing pattern for the Blanco Mesaverde Pool has been established by the Commission and has resulted in the orderly development of the field. Since El Paso has some feeling that the field should be drilled on 160-acre tracts, then it should apply to the Commission for such spacing. The current application, if approved, will seriously undermine the principles of well spacing for the protection of correlative rights and the prevention of waste. Union recommends that the Commission reject the application.

I also have a prepared statement from Amerada Hess Corporation, which is substantially the same as that for Union and I would prefer just to leave the written statement with the Commission rather than read it into the record at this time.

Now, in connection with this case I feel there is a very serious question that the Commission has authority to do what El Paso was asking them to do in the manner which they are asking. In the first place, the only basis on which this Commission can act is the prevention of waste. That's the ruling of the Supreme Court in the case of Simms v. Meachem, where the Supreme Court held that even when the Commission was simply converting to non-standard units into two standard units unless they had evidence in the record on which they could make a finding that waste would occur, that order was invalid. So the only reason the Commission can act is to prevent waste.

Now, what kind of waste are we talking about? El Paso has said in their testimony that there will be un-recovered gas left in the reservoir which could otherwise be recovered, but their testimony as to where this gas is is very, very hazy; the testimony as to the amount is based on averages of the calculated reserves of the present wells

with no true indication that the additional well will actually encounter additional reserves. You could take the pressure decline curves on the additional wells and make a calculation if they were available but they are not available so all we have is the pressure decline curve on the existing wells.

The testimony of El Paso's Witness very clearly shows that the present wells are draining this reservoir. The Witness admitted that this is true; that there is communication between wells. Their Exhibit No. 17, for example, with their three strat tests, show that between 1959 and 1973 there was a drop of 217 pounds. Now that shows there are wells that are not being produced. Their average bottomhole pressures based on the 7-day test showed a drop of 306 pounds during this same period and if we use their P/Z values we get the same result; that's shown on their Exhibit No. 19, where the three strat tests showed a drop of 277 pounds in the total field 358 pounds and the Witness stated that all the wells show the result of communication.

Nothing could be more graphic than El Paso's Exhibit No. 16 which shows a steady decline in this pool in pressures and very dramatically shows when production

was increased it had a direct effect on the pool pressures. So, something is draining this pool and it is being drained by the present wells.

Now, if there is any gas to be left based on El Paso's testimony, it will be in the stringers which the Witness says hasn't been accounted by any wellbore. Now in support of that testimony they offered us two logs to show the existence of stringers across this pool. Why didn't they give us a cross section across the entire pool? It would be a far better picture showing the continuity or discontinuity of this reservoir than to ask the Commission to determine on the basis of two logs that there is discontinuity throughout the reservoir. No cross section was offered.

Now, this is not acceptable testimony to propose a change in what amounts to a proration formula. The Commission well knows what findings it must make to change a proration formula. It is in the statutes and it was decided in the Continental Oil Case and the El Paso Case. The only thing we have then is a highly speculative conclusion that if you encounter a stringer that isn't connected to the wellbore you'll get some more gas, and that's just about the extent of this testimony.

Now if the Commission is going to approve this Application it would have to make a finding of waste. Now if there is waste occuring or expected to occur it would be gas left in the reservoir which would not otherwise be recovered. If the Commission makes that finding it in effect and probably directly would have to make a finding that one well will not efficiently and economically drain and develop 320 acres. The Commission has made the finding that one well will drain 320 acres and I feel that we should have more respectable testimony than has been offered in this Hearing to change the spacing and El Paso didn't even ask that the spacing be changed, but that's the result of what the Commission would have to find. If it made such a finding and did not change the spacing, that would do violence to the statute which authorizes the Commission to create proration units.

Now, another significant fact in my opinion is that El Paso offered absolutely no interference tests. I'm sure that had they done so, as indicated by their Exhibits 16, 17, and 19, they would show interference across the area and that one well would, in fact, drain 320 acres.

I thank the Commission for their patience and I will leave this one statement with you.

MR. PORTER: All right. We have a gentleman back there.

MR. CARR: Millard Carr for Tenneco Oil Company.

I would simply like to read the statement that we filed with the Commission on August 5th.

Tenneco Oil Company submits a statement to New Mexico Oil Conservation Commission concerning the amendment to Order No. R-1670 as proposed by the Applicant, El Paso Natural Gas Company.

(Reading) Tenneco owns very substantial leasehold and royalty interests in Blanco Mesaverde Pool. We request that serious consideration be given to some of the undesirable results of such an amendment as proposed by El Paso. Our objections to the infill drilling proposal involve interrelated legal contractual and economic problems.

The first general category, while including economic implications, concerns primarily the following contractual and correlative rights and legal complications. First, the proposed amendment does allow such a well to be drilled on the existing 320-acre spacing unit rather than establishing the standard 160-spacing system. However, operators will still face lessor demands for infill drilling or compensatory royalties on locations that

the operator deems uneconomical with loss of the original 320-acre developed status an operator might even lose through litigation the 160-acre tract which is later drilled would drain his existing wells.

Second, Applicant El Paso, as a public utility, can increase profits by increasing investments. El Paso could therefore drill additional wells profitably in locations where a non-utility producer could not. Did not El Paso's additional wells and production in such a situation result in drainage from off-set leases in non-utility producers?

Again, the off-set operator would be faced with legal demands for infill drilling or compensatory royalties for unprofitable locations.

Third, it is probable that the second well drilled on the 320-acre proration unit would deliver production in interstate commerce the higher price in the first well. The Applicant's proposed amendment is no assurance that either well would be produced rateably with respect to the others. In fact the proposed amendment would allow allocated allowable production to be taken from either or both of the wells at a ratio left to the operator's discretion. Should there be a substantial sales differential

between the two wells the ratios of production might easily be manipulated, to a pipeline producing operator's advantage, with resulting complaints from royalty and working interest owners in the proration unit.

Fourth, in the Blanco Mesaverde Pool there are leases having substantial variations in total royalty and overriding royalty burdens. The proposed amended rules should not preclude an operator from giving drilling priority to its leases with low royalty burdens, thus resulting in unwarranted drainage from more highly burdened leases.

Fifth, the Applicant claims the Mesaverde infill proposal to be of critical importance in meeting future market demands. However, El Paso is not the only producer of gas in the Blanco Mesaverde Pool. If another purchaser is unable or unwilling to take additional production capacity of the two wells for 320-acre proration system, substantial drainage could result.

The other objectional category contains economic implications of the proposed amendment to the operators in Blanco Mesaverde Pool. Economic considerations alone might be claimed by some to be beyond the scope of the Commission's jurisdiction. However, because of the unique

differential between the Applicant's profit position and public utility and the other operator's positions as non-utility companies, the profitability question must be considered as affecting the ability of operators to drill under the proposed system to prevent drainage and protect correlative rights. In this light, Tenneco submits the following opinion or questions for consideration by the Commission.

(1) In face of rapidly escalating drilling costs, high interest rates and pipe shortages, the non-utility company is not faced with the same profit potential position as the utility company operator. The ultimate cost to complete infill development of the Blanco Mesaverde Pool could well exceed $300,000,000. Funds available to an operator requires infill drill and also pipe allocations would have to be divergent from other projects and injections are to find and develop new reserves, not to accelerate completion of existing reserves. The cost of capital becomes a critical consideration for profit potential of an acceleration program. A non-utility operator could not justify the possibility of nearly as many infilled wells as could El Paso which has only to prove that the expenditure would be prudent in order to be allowed

an acceptable return on his investment. The present uneconomical locations of non-utility operators might be economic in a few years if gas prices increase, but during the interim El Paso could off-set and substantially drain these locations.

(2) If El Paso does desperately require additional delivery from the Blanco Mesaverde Pool, why not investigate less costly alternatives. One such alternative would be for El Paso to install additional compressions on its gathering systems and so lower the delivery pressure of wells connected to them. Another would be to alter the present allowable system from the pool. It is not unusual in the Blanco Mesaverde and other prorated gas pools to find wells producing below their indicated potential in order to keep production within the allowable limits.

In summary, Tenneco does not recognize El Paso's market demand problems as complete justification for additional infill drilling in Blanco Mesaverde Gas Pool. El Paso's proposed amendment is selfserving by shifting too much of the cost burden to the operators of the pool. The proposed changes of Order No. R-1670 can result in a continuing series of complicated and extensive legal

problems and force undue hardships on the other operators who may not have available the capital funds necessary to protect their interests.

Tenneco is therefore opposed to the amendment as proposed by the Applicant.

MR. WYNN: If it please the Commission, my name is R.C. Wynn. My offices are at 3303 Lee Parkway, Dallas, Texas. I would like to make just a very short statement, Mr. Chairman.

I operate and have an economic interest in 27 producing units completed in San Juan Basin as well as some undeveloped acreage. It is my opinion that additional economic reserves will be recovered through infill drilling and therefore I do support the Applicant, El Paso Natural Gas Company, in this Case.

MR. PORTER: Mr. Lyon?

MR. LYON: Mr. Chairman, I'm W.P. Carr from Dallas Texas and I guess that I am the only guy in this room to which this thing isn't just cut-and-dried and real clear. I hear that the price of gas is 44 cents and that it may not be 44 cents. I hear the old gas price is 24 cents; we've got all kinds of calculations offered

on the basis of 24 cents. Now I hear the price of gas may not be 24 cents. If the price of gas is 24 cents for old gas and 44 cents for new gas I am in favor of the El Paso Application. If the price of old gas should be some higher fee than 24 cents I cannot state at this time whether I am for it or against it, but the one thing that sticks out in my mind in all of this is that the proponents for it are not in a hurry. They say that if this thing is granted they're going to take their time and start slowly, all except Mr. Schultz, and I'm like Mr. Schultz. I don't have many wells to drill and I don't have any time, but as quick as I can get it I have no better place to drill a well than in the Mesaverde and the San Juan Basin and I hope that the Commission will wait until some of these financial matters have been clarified by the Federal Power Commission before they take any action in such an important decision.

I thank you.

MR. LYON: V.T. Lyon, Continental Oil Company. I regret that I can't put more knowledge into this Hearing, but it just happens that the Hobbs Division acquired the responsibility for this area about a month ago and I'm really getting educated.

It appears to me that we have here in the Blanco Mesaverde the usual problem that where you don't need to drill the well for drainage you can afford to do so, but when you really need to get drainage you can't afford to drill the well. This is a problem, I guess, that will always be with us.

Essentially I would like to concur in Tenneco's statement, our positions are very similar. Actually, in essence of specific development program by El Paso, who is the predominant operator in the area, we found ourselves unable to completely evaluate where we stand on their proposal and until we have such programs we cannot support El Paso until that time and thus oppose their Application.

Thank you.

MR. PORTER: Does anyone else have a statement, other than Mr. Morris? I think he wants to be last.

Mr. Morris, before you begin your statement, Mr. Carr will acknowledge some other correspondence that we have.

MR. CARR: Mr. Chairman, the Commission has received a letter from Marathon Oil Company in opposition to the Application of El Paso Natural Gas. We have also

received a letter from the Public Service Commission, signed by Richard C. Montoya, Chairman of the Commission outlining their concern, indicating that their concerns parallel those of Southern Union Gas Company and calling on the Commission to give due consideration to the effect our decision would have on the consumers of New Mexico presently and in the future.

MR. PORTER: Mr. Morris?

MR. MORRIS: If the Commission please, I think I have mentioned to this Commission in the past that very few cases in my opinion are won or lost on the basis of opening arguments and closing statements, and I certainly hope that that's the situation in this Case. For a change I really intend to be quite brief in my closing statement.

The fact that sticks out in this case like -- most prominent -- is that by anyone's evidence the recoverable reserves in this Blanco Mesaverde Gas Pool will be substantially increased as a result of the infill drilling program. The only opposition to the El Paso Application in this Case with respect to the increase in recoverable reserves was that offered by Southern Union Production Company, and even Southern Union Production

Company acknowledged that the recoverable reserves field-wide could be increased by -- I think I do not misquote them -- by somewhere in the magnitude 10 or 11 percent. Now, El Paso estimates a little more than that. We simply recount the very pertinent figures. Our testimony is that the recoverable reserves in this field, absent infill drilling are 8.7 trillion cubic feet; we believe that the recoverable reserves will be increased by the infill drilling program by an additional 6.3 trillion cubic feet to result in an overall ultimate recovery of the pool of some 15 trillion cubic feet.

Now if we start from the same place--and I don't recall that there has been much dispute about this -- that there is about 8.7 trillion cubic feet that would be recovered under the existing state of development, and you add 10 or 11 percent, take 10 or 11 percent of that, even under the Southern Union Production Company position, you still have an awful lot of gas. 10 or 11 percent of 8.7 trillion cubic feet represents a substantial increase in recoverable reserves.

We believe the Commission's duty in this case lies before them very clearly: That in order to prevent waste, it should grant the Application of El Paso in this

Case. We're not unmindful of the problems of correlative rights, but as has been pointed out previously in this Case, the question of protection of correlative rights is largely subsumed in the question of prevention of waste. Correlative rights will be violated unless the owners of the reserves are afforded the opportunity to produce them and they will only be afforded the opportunity to produce the recoverable reserves under their properties by the granting of the Application in this Case which will allow the infill-drilling program to proceed.

Although we do not agree with the fears that have been voiced by Mr. Byrd on behalf of Mesa concerning the question that he poses as to whether the new price for gas would be applicable to these infill wells, we would urge the Commission to make its findings strong and clear with regard to the increased recoverable reserves that this program can reasonably be expected to generate, so as to speak loudly and clearly to the Federal Power Commission that the new price that will be applicable to these wells indeed has made the program economically feasible and has encouraged the operators to enter into the program and to drill the infill well. We believe if the Commission speaks clearly in that regard it will go

far to allay the fears that Mesa has and will go far to satisfy the Federal Power Commission that its philosophies with regard to pricing are being met by the development of these additional wells.

We very much appreciate the Commission's attention in this case and needless to say we urge the Commission to act promptly, expeditiously upon this request; we ask that you not hold it for some undetermined time to see what might happen in the Federal Power Commission or in the courts because somehow it seems that if we wait for the decisions of other bodies to make everything clear for us we will wait and wait for an indefinite period of time. We would urge the Commission to act favorably upon the Application so that all operators in the San Juan Basin may know where they stand, may order their priorities with regard to the availability of tubular goods and rigs and we can get this program underway.

I can't avoid in a closing statement to again state that obviously El Paso Natural Gas Company needs not only the reserves but the current deliverabilities that would be afforded by this program to satisfy its market demand. We feel that this Commission should consider the public interest of the entire nation with

regard to the need for natural gas supplies. We feel the Commission should consider El Paso's interstate market demand. We submit to the Commission that whether you consider that or whether you do not, the evidence before the Commission with regard to the prevention of waste and protection of correlative rights will strongly support an order of the Commission granting the Application of El Paso in this Case.

Thank you.

MR. CAMPBELL: Mr. Chairman, I'm compelled to mention to the Commission, based upon Mr. Morris' closing statement, that he either misunderstood or has mistakenly and inadvertently misstated the position of Southern Union Production Company and the testimony of Mr. Arore in connection with the stated additional recoverable reserves, and I invite the Commission to read Mr. Arore's testimony, which I believe clearly pointed out that he was addressing only the Southern Union Gas Company wells; that his estimate of recoverable reserves was 2.8 billion cubic feet as compared to the average that El Paso presented at 4 billion cubic feet. We don't want him or the Company to be in the position of substantiating any facts because I don't believe his testimony

did substantiate the kinds of estimates of additional recoverable reserves.

MR. MORRIS: If the Commission please, certainly if I misstated Southern Union's position I didn't mean to do so, but I submit, nevertheless, that there has been an admission of substantial increased recovery even under Southern Unions position. I am perfectly content to let the record stand and speak for itself in that regard.

MR. PORTER: Does anyone else have anything to offer in this Case?

I believe that all of the attorneys, with the possible exception of Mr. Byrd, who have represented the people who have presented testimony, are present, and I want to suggest that you submit to the Commission by September 1 suggested findings of fact.

MR. HINKLE: From nyone who participated in the Hearing?

MR. PORTER: By September 1. That gives you a little more than two weeks.

(Whereupon, the Hearing was adjourned.)

STATE OF NEW MEXICO)
) SS.
COUNTY OF SANTA FE)

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

RICHARD L. NYE, Court Reporter