Case No. 330

Application, Transcript,
Small Exhibits, Etc.

April 15 1950

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Santa Fe, New Mexico

* * * * *

TRANSCRIPT OF PROCEEDINGS

CASE NO. 330

Regular Hearing

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 15, 1954

IN THE MATTER OF:

Under terms of Order R-128-A entered on November 10, 1953, hearing was again set for this date on Stanolind Oil and Gas Company's application for the amendment of Order R-110 relating to the Blanco-Mesa Verde Pool, San Juan and Rio Arriba Counties, New Mexico. } Case No. 330

BEFORE:

Honorable Edwin L. Mechem, Chairman
Mr. E. S. (Johnny) Walker, Member
Mr. R. R. Spurrier, Secretary & Director

TRANSCRIPT OF HEARING

MR. SPURRIER: Is there anyone to be heard in Case 330?

MR. TOWNSEND: Jim Townsend for Stanolind Oil and Gas Company. At the time the case was called last month, or rather I should say a statement was made to the Commission last month that the case would be called this month and was requested by the San Juan operator or representative of the group that the case be continued. We understand that a petition has been filed by Pubco Development Corporation, a Company, that such case be continued and we have no objection to that. We think that probably it should be considered with the question of gas proration in the entire San Juan Basin, and Stanolind, while it is not urging the continuation, nor is it objecting to it, has no real concern about it being continued further at this time.

MR. SPURRIER: That is correct, Pubco did make a motion by letter for continuance. I don't have the letter at the moment. They did make a motion for continuance. As the Commission said at the last hearing, upon a proper motion we would continue the case to May 19th. Is there objection to Pubco's motion? If not the case will be continued to the regular May 19th hearing.

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

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the Oil Conservation Commission of the State of New Mexico, held on Thursday, April 15, 1954, in Mabry Hall, Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

DATED this 17th day of April, 1954, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
REPORTER

ADA DEARNLEY & ASSOCIATES
COURT REPORTERS
ROOM 105-106, EL CORTEZ BLDG.
PHONES 7-9645 AND 5-9546
ALBUQUERQUE, NEW MEXICO

May 19, 1954

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Santa Fe, New Mexico

* * * * *

TRANSCRIPT OF PROCEEDINGS

CASE NO. 330, 330a

Regular Hearing

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
Santa Fe, New Mexico
May 19, 1954

IN THE MATTER OF:

(From April 15) Stanolind Oil and Gas Company's application for the amendment of Order R-110 relating to Blanco-Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico.

Application of the Commission on its own motion to consider an order promulgating rules and regulations for the Blanco-Mesaverde Gas Pool, San Juan and Rio Arriba Counties; matters to be considered include gas pool delineation and definition, gas proration, gas well spacing, gas proration units, and related matters.

Cases No's.
330
330 A
Consolidated

BEFORE THE FULL COMMISSION

TRANSCRIPT OF PROCEEDINGS

MR. SPURRIER: The meeting will come to order, please. The next case on the docket is Case 330. Mr. Barnes.

MR. BARNES: Mr. Spurrier, before the case 330 is taken up, I have a letter here and an outline of the work that was done by the San Juan Basin operators Committee in regard to the study of proration of gas in the Mesaverde reservoir in the San Juan Basin in Northwestern New Mexico. I would like to present this to the Commission and to read this letter into the record, if I have your permission.

MR. SPURRIER: You may.

MR. SELINGER: Doesn't that apply to both Case 330 and 330-A?

MR. BARNES: I think it would apply to both Cases.

MR. SPURRIER: We have no objection to consolidating those Cases.

MR. TOWNSEND: We would like to have the Commission do so and have the record in Case 330 and 330 A, Consolidated.

MR. SPURRIER: Is there objection, without objection we will consolidate the cases.

MR. BARNES: This letter is dated May 18, 1954, and addressed to Oil Conservation Commission, Santa Fe, New Mexico, "Gentlemen: Enclosed herewith is an outline of the work accomplished by the Engineering Subcommittee of the San Juan Basin Operators Committee in regard to gas proration in the Mesaverde formation of the San Juan Basin of northwestern New Mexico. An executive session of the San Juan Basin Operators Committee, as a whole, was held May 18, 1954. A report of the sub-committee was reviewed, amended and adopted by this committee and is enclosed with this letter.

At the meeting today of the San Juan Basin Operators Committee, there appeared to be a desire of the majority to compromise on a proration formula of 75% deliverability times acreage plus 25% acreage. However, there was a minority present who was not in agreement with this formula.

The San Juan Basin Operators Committee has not taken any stand for or against the proration of natural gas in the Mesaverde reservoir in the San Juan Basin. Any such position will have to be taken by the individual members and any testimony for or against proration would also have to be submitted by the individual members.

Because of the scope of this study, the operators committee hereby recommends that all proration hearings be heard on a separate day and not as a part of the monthly hearings, in order that there will be no interruption or interference with the testimony presented and this date be set not sooner than 30 days from today. This will

also allow more adequate time to combine data, and provide the members an opportunity to prepare additional and more complete data to present to the Commission.

We sincerely hope that the enclosed data will be of assistance to the Commission to consider the problems of proration."

MR. SPURRIER: Does anyone have testimony to present in either Case 330 or 330 A?

MR. TOWNSEND: Mr. Jim Townsend for Stanolind. Stanolind in Case 330 offered testimony some year and a half ago, if the record in Case 330 is made a part of 330 A, that testimony will speak for itself, however, we would like to reserve the right to amend the rules which we suggested at that time to bring them up to date in the light of experience which has been gained in Southeastern New Mexico and in the light of certain operating procedures including testing procedures which we understand have already been established in the Blanco-Mesaverde Pool. With that statement, we have no further evidence to offer in Case 330 at this time and no objection to its continuance, if that maybe the wish of the Commission.

MR. SPURRIER: Mr. Kelleher, do you have a motion?

MR. KELLEHER: Gentlemen of the Commission, I filed a motion asking for a continuance from May 19th to June 19th, if that date would be agreeable to the Commission or approximately that, for the reason we believe that the intervening time will afford all parties in interest an opportunity to correlate their findings and endeavor to reach some formula. We feel there might not be too great an objection upon which the Commission might act with intelligence. Therefore, we join in the request for a deferrment of the actual hearing

of the Case for a period of 30 days, if that is consistent with the wishes of the Commission.

MR. SPURRIER: Does anyone else have a comment in the Case?

MR. GRIENER: A. S. Griener, Southern Union Gas Company. I would like to suggest that a special meeting be given to this 330 or 330-A that at least two days be allowed for it or that if a one day setting be given that it be at such a time that it can be eventually carried over to the next day. All the indications at the Operators Committee meeting yesterday were that there might be a rather substantial volume of testimony that various interested parties might want to adduce. It seems to me it would be inappropriate to try and pick one day setting and then have to continue it to wind it up. It would be better if we could have a two day setting.

MR. SPURRIER: Anyone else?

MR. ZINN: I am speaking for King Loe Petroleum he is one small voice crying in the wilderness with three wells concerned. We concur in the recommendations made by Southern Union to give the people interested a couple of days because there is quite a bit to be said.

MR. SPURRIER: Anyone else? We find that on account of the Commissioners being absent and Land Sales and one thing and another we can't set it up that particular week of the 19th, early in the week but we can set it up for the 18th which is on Friday. If necessary go over to, into Saturday, the 19th.

MR. SELINGER: Mr. Spurrier, I wanted to point out that in the resolution, the recommendation was that at least 30 days. It doesn't necessarily have to be exactly 30 days. As a matter of fact, I think that the longer time we operators have, the more apt we are

to present a more fuller hearing. It is a very complex problem and if you can't get it in that week or even in June, I think it would be of sufficient magnitude and help to the operators that it be set over to July. The more time, the more information we will be able to furnish the Commission.

MR. SPURRIER: I don't know if I agree with that or not, Mr. Selinger. We have been stalling around on this Case now for several months. I can say for the Commission right now that based on the information we have at the moment, that it is our present opinion that gas should be prorated in the San Juan Basin.

MR. SELINGER: We agree with you.

MR. SPURRIER: We want to give you all the time that is necessary to get a real record.

MR. SELINGER: We agree with you on the fact that there should be a proration of gas in the San Juan Basin. As a matter of fact, we would like to urge the Commission to put that into effect immediately and use a simple formula until such time as sufficient enginsering data to sustain a proper allocation formula.

MR. SPURRIER: I might say that the Commission's staff will be prepared at the next hearing to put on testimony. If it becomes necessary, we can probably do just what you have suggested with the staff's testimony.

MR. SELINGER: I think setting this matter on a Friday, I think would be rather a poor thing because while some have judged it to be a two day hearing, I doubt if it will even be completed in two days. I would urge the Commission to set it at the first of the week and make as much time available as possible during that week.

MR. SPURRIER: All right, the Commission will all be here on the 21st, which is Monday, June 21st. We are agreed that we will continue the Case until June 21st at nine o'clock in this hall.

MR. TOWNSEND: Is it necessary that an order be issued by the Commission, consolidating the Cases so that the record in Case 330 will be a part of the record in Case 330-A?

MR. SPURRIER: I don't think an order is necessary, I think the record should show definitely that these cases are consolidated and that the testimony which we have taken so far in 330 will be incorporated in 330-A.

There is another matter for the record, I think that the Commission realizes what a lot of work this engineering sub-committee of the San Juan Basin Operators has done. We appreciate it. We don't want to give you the wrong idea about our comments on extending the time. We have no intention of extending the time indefinitely. We do appreciate the work that has been done and we want you to know that. The next Case on the docket is Case 696.

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

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 26th day of May, 1954.

Ada Dearnley
Notary Public, Court Reporter

My Commission expires:
June 19, 1955.

EXECUTIVE COMMITTEE OFFICERS
FRANK BARNES, Chairman
Consultant [redacted]
F. P. CRUM, Vice Chairman
J. D. Hancock & Co.
TOM BOLACK, Sec.-Treas.
Independent

San Juan Basin Operators Committee
211½ WEST MAIN STREET
FARMINGTON, NEW MEXICO

EXECUTIVE COMMITTEE MEMBERS
AL GREER, JR., Benson-Montin
W. T. HOLLIS, El Paso Natural Gas Co.
J. B. HOWELL, Delhi Oil Corp.
CLAUDE TEEL, Skelly Oil Co.
D. LOOS, Blackwood-Nichols
G. W. R. HOY, Attorney

May 18, 1954

Oil Conservation Commission
Santa Fe, New Mexico

Gentlemen:

Enclosed herewith is an outline of the work accomplished by the Engineering Subcommittee of the San Juan Basin Operators Committee in regard to gas proration in the Mesaverde formation of the San Juan Basin of northwestern New Mexico. An executive session of the San Juan Basin Operators Committee, as a whole, was held May 18, 1954. A report of the sub-committee was reviewed, amended and adopted by this committee and is enclosed with this letter.

At the meeting today of the San Juan Basin Operators Committee, there appeared to be a desire of the majority to compromise on a proration formula of 75% deliverability times acreage plus 25% acreage. However, there was a minority present who was not in agreement with this formula.

The San Juan Basin Operators Committee has not taken any stand for or against the proration of natural gas in the Mesaverde reservoir in the San Juan Basin. Any such position will have to be taken by the individual members and any testimony for or against proration would also have to be submitted by the individual members.

Because of the scope of this study, the operators committee hereby recommends that all proration hearings be heard on a separate day and not as a part of the monthly hearings, in order that there will be no interruption or interference with the testimony presented and this date be set not sooner than 30 days from today. This will also allow more adequate time to combine data, and provide the members an opportunity to prepare additional and more complete data to present to the Commission.

We sincerely hope that the enclosed data will be of assistance to the Commission to consider the problems of proration.

Respectfully submitted,

SAN JUAN BASIN OPERATORS COMMITTEE

Frank C Barnes

FCB:BW

By FRANK C. BARNES, Chairman

SAN JUAN BASIN OPERATORS COMMITTEE
Farmington, New Mexico

Subject: Report of the Engineering Sub-Committee on Allocation of Production to Gas Wells, San Juan Basin

To the Members of the
Oil Conservation Commission
Santa Fe, New Mexico

At a meeting of the San Juan Basin Operators Executive Committee held November 30, 1953, an Engineering Sub-Committee was appointed to study the effect and feasibility of rateable take of gas in the San Juan Basin. This Committee has held four meetings.

A report outlining the results achieved at these meetings follows. In the interest of achieving some measure of clarity, this report is divided as indicated below.

I. The Committee: Its purpose and business.

II. Scope of Study.

III. Characteristics of the Blanco Mesa Verde Reservoir.

IV. Type of Allocation Formulae considered.

V. Minimum and Maximum Allowables.

VI. Specific Formulae, Agreements and Compromises.

I. THE COMMITTEE: ITS PURPOSE AND BUSINESS

Five members were appointed by the Executive Committee to comprise the engineering sub-committee. These were:

Frank Barnes, Independent Geologist
Scott R. Brown, Western Natural Gas Company
Truitt Hollis, El Paso Natural Gas Company
Fred P. Crum, Jr., J. D. Hancock & Co. Ltd.
Albert R. Greer, Benson-Montin

Because of the general interest to all San Juan Basin producers, the meetings were open to any operator who desired to be represented, and those attending were also considered the same as members of the sub-committee. The meetings were well attended and in general considerable interest was shown by the members.

At the first meeting, the sub-committee concluded that the first order of business should be an attempt to devise an allocation formula suitable to the San Juan Basin and, if possible, acceptable to all the operators.

The committee, as such, had no authority designated it by the Oil Conservation Commission, nor was it empowered to vote for, or on behalf of, the San Juan Basin Operators Committee. It was merely an engineering sub-committee, which studied methods of gas allocation and which was obligated to report its findings to the Executive Committee. The general intent and purpose being that perhaps a formula could be devised which would be acceptable to most of the operators and perhaps could be recommended by the San Juan Basin Operators Committee, as a whole, to the Oil Conservation Commission.

II. SCOPE OF STUDY

It was generally agreed that the committee should devote its study to the determination of an allocation formula to distribute production among wells within a pool. The committee's thoughts relative to pool nominations and methods of handling over and under production and allowable schedules were that these matters should be left to the Oil Conservation Commission and the pipe line companies.

At the first meeting, the committee planned to study formulae for both the Blanco Mesaverde field and the Pictured Cliffs fields. Some of the general characteristics, which may affect proration, differ between the Blanco Mesaverde and the Pictured Cliffs fields. Although the same type formula may apply to both formations, the differences should be considered. Among other things, these differences are: (1) The Blanco Mesaverde has been developed on a fairly uniform pattern of 320 acres per well, whereas the Pictured Cliffs fields have been developed under spacing regulations varying from 40 acres to 320 acres per well. (2) The Mesaverde has been developed over a comparatively small interval of time, whereas the Pictured Cliffs development in one field has been continued for over thirty years. (3) Initial shut-in pressure differences in the Blanco Mesaverde show a limited range approximating 100#, whereas initial shut-in pressures of Pictured Cliffs wells vary from approximately 500# to about 1000#, and some wells which are currently being completed in the old fields have initial shut-in pressures as low as 300#.

Since the Mesaverde is the larger producer, the committee decided to work on it first. Inasmuch as the Oil Conservation Commission has a hearing scheduled in May for proration in the Blanco Mesaverde field, the sub-committee at its fourth meeting felt compelled to complete its work on this field, and it has not found time to make a separate study, as such, of the Pictured Cliffs fields.

In view of the foregoing, the committee's work and this report are therefore limited to the study of an allocation formula distributing production to wells within the Blanco Mesaverde pool.

III. CHARACTERISTICS OF THE BLANCO MESAVERDE RESERVOIR

It is not the intent of this section to present a reservoir study of the Mesaverde formation, but to point out some of the factors and opinions, part of which are controversial, but all of which affected the opinions of the members relative to a proration formula.

A. Sands open to production: In the area considered, the Mesaverde formation can be divided into three generally traceable members, which are the Cliff House, the Menefee, and the Point Lookout. The Point Lookout is thought to be the primary productive sand in most areas, and is the sole sand open to production in some parts of the field. In other parts of the field all three members are open to production.

For practical purposes of production the entire Mesaverde formation has been considered by the Oil Conservation Commission as a common source of supply. However, where it is productive, and open to the well bore, the Cliff House contributes gas to production in addition to that which might have been obtained from the Point Lookout alone. Some of the members of the committee also voiced the opinion that in some wells the Menefee is productive. In some parts of the field, then, production from any one well may be from more than one zone of the reservoir.

B. Core Data: The committee did not have the time to make a study of core analyses, or attempt correlations of core analyses with logs. Very little time was spent reviewing core data.

C. Range of Productivity: A considerable variation in productivity exists, not only by areas, but in offset wells. This gives rise to the question that a well's productivity may or may not truly reflect the average sand conditions under its tract.

D. Degree of Communication: No interference tests were made available to the sub-committee. Agreement among committee members was not reached as to degree of communication that exists between wells. Some held the opinion that the large wells were draining areas considerably in excess of 320 acres. Others held the opinion that no communication exists over areas greater than the 320 acres assigned to each well.

E. Relation of Productivity to Reserves: Discussions relative to formulae suggested inevitably ended in the controversial question of the relation of well productivity to reserves under its tract. Some of the members expressed the opinion that the unusually large wells resulted from a fractured condition, and as such, whatever relation might elsewhere in the field exist between productivity and reserves would not hold for the unusually large wells. Others stated the opinion that these high capacity wells resulted from thicker and better sand bodies.

IV. TYPE OF ALLOCATION FORMULAE CONSIDERED

A. The Kansas-Hugoton Formula: This formula is deliverability times acreage, in which the deliverability is measured at 80% of the field average shut-in pressure. This formula purports to equalize pressures in a field through the measurement of deliverability against a relative high back pressure, which is determined as a field average. Some members of the committee who have had experience with this formula reported that it does tend to equalize pressure, and hence, withdrawals, but is effective only on a regional, or areal, basis; and does not protect small wells against high productivity offsets. Also, this formula would have a very drastic effect in reducing allowables of low pressure wells. For these two reasons, the committee decided against use of deliverability as defined in the Kansas-Hugoton proration order.

B. Exponential Type Formula: There is considerable merit to an exponential type formula (acres times deliverability raised to a power less than 1) which can be developed analytically for any field where adequate core data is available. The committee, however, felt that it did not have the time, and perhaps not enough core data to be representative, to develop a formula of this type, so no effort was made to develop an exponential type formula.

C. Additive Type Formula: A formula in which there are two additive factors, namely acreage and deliverability, was considered by the committee as one having the best possibilities of permitting the committee members to reach agreement.

V. MINIMUM AND MAXIMUM ALLOWABLES

Some of the members thought that a minimum allowable should be one of the requirements of the allocation formula and that the formula should, in itself, provide the minimum allowable; or, if not provided for in the formula, then the minimum allowable should be separately specified. Full agreement was never reached on this issue. Qualified agreement was obtained in connection with one of the formulae, as later discussed herein. The member suggesting the minimum allowable originally recommended a figure of 400 MCF/day. Those opposing a minimum allowable never agreed to more than 250 MCF/day and this was in conjunction with a compromise formula only.

As used herein, the members define "minimum allowable" to be some particular rate of production from a well, below which that well will not be restricted in production rate by proration formula. This minimum allowable, however, must not exceed the well's deliverability as determined by the Oil Conservation Commission.

At the last sub-committee meeting, a maximum allowable of 5,000 MCF/day was suggested. This was the first meeting that this thought was introduced and, consequently, the sub-committee has not discussed its merits or drawbacks as fully as the minimum allowable.

VI. SPECIFIC FORMULAE, AGREEMENTS AND COMPROMISES

The committee agreed that possibility of reaching a unanimous approval of one formula by the Operators Committee would be best if it were composed of two additive factors as follows:

(1) "Deliverability" times "Acreage"
plus
(2) "Acreage"

in which "Deliverability" is the individual well's deliverability as determined by the method now in use in the San Juan Basin. For new wells which have not been tested, their deliverabilities and allowables would be estimated. The allowable so estimated would be subject to correction at such time as the well is tested and its true deliverability determined, and appropriate over or under production would be calculated and proper adjustment made in future allowables.

"Acreage" would be 320 acres for each well, unless the Conservation Commission has approved assigning it less than 315 acres or more than 325 acres.

It was agreed that the weight given to deliverability should be in the range of 50% to 100% of the formula, and the weight given to acreage should be between 50% and 0%.

In the above form, three specific formulae were recommended by various members. These were as follows:

1. 100% deliverability times acreage plus 0% acreage.

2. 50% deliverability times acreage plus 50% acreage.

3. 75% deliverability times acreage plus 25% acreage.

Those members supporting Formulae 1 and 2 could not agree on an "in-between" formula which they would recommend on an engineering basis. An attempt, however, was made to reach a compromise by the use of the third formula and applying a minimum allowable which would be subject to possible correction and review by the Oil Conservation Commission

It appeared that those members present at the fourth sub-committee meeting might finally agree upon the compromise formula, being 75% deliverability times acreage plus 25% acreage, and by setting a minimum allowable. ~~The qualifications to complete agreement by the sub-committee in the use of this formula as a compromise were with respect to the amount of the minimum and maximum allowables.~~ 30M.

In conclusion, the sub-committee did not feel that it was in a position to make a definite recommendation as to a proration formula that could, in turn, be recommended to the Oil Conservation Commission in regard to the Blanco Mesaverde reservoir.

Fred P. Crum
FRED P. CRUM
Vice Chairman

Frank C. Barnes
FRANK C. BARNES
Chairman,
San Juan Basin Operators Committee

Tom Bolack
TOM BOLACK
Secretary-Treasurer

Albert R. Greer
ALBERT R. GREER
Chairman,
Engineering Sub-Committee

Before the Oil Conservation Commission
of The State of New Mexico

In the matter of the Hearing
Called by The Oil Conservation
Commission of The State of
New Mexico for the purpose
of Considering:

Cases 330 and 330 A
(Consolidated)
Order No R- _____

The application of Standard
Oil & Gas Company for an
~~order~~ amending Order R-110
relating to the Blanco-Mesaverde
Gas Pool, San Juan and Rio
Arriba Counties, New Mexico

and also:

The application of the Oil
Conservation Commission upon
its own motion for an order
promulgating rules and
regulations affecting and
governing the Blanco-Mesaverde
Gas Pool, situated in San Juan
and Rio Arriba Counties, New Mexico

Order of The Commission

By The Commission

These causes came on for hearing at 9:00 o'clock a.m. April 15, 1954, May 19, 1954 and June 21, 1954 before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

Now, on this _____ day of _____ 1954, the Commission, a quorum being

present, having considered the testimony adduced and the exhibits received at said hearings, and being fully advised in the premises f--

Finds:

(1) That due notice of the time and place of hearing ~~having~~ and the purpose thereof having been given as required by law, the Commission has jurisdiction of the case and the subject matter thereof.

(2) That under date of February 25, 1949, the Commission issued its Order 799 creating ~~and defining~~ the Blanco-Mesaverde Gas Pool. That Order 799 defined the vertical and horizontal limits of the Blanco Mesaverde Gas Pool and that by subsequent orders the commission extended the horizontal limits of the Blanco Mesaverde Gas Pool.

(3) That under date of November 9, 1951, the Commission issued order No R-110, amending and revising Order 799, to provide for 320 acre proration units, drilling & pipe cementing procedures, well spacing, and other pertinent rules.

(4) That the producing capacity of the Gas wells in the Blanco-Mesaverde Gas Pool is greater than the market demand for gas from the Blanco Mesaverde Gas Pool.

(3) That for the purpose of preventing waste and for the protection of Correlative rights Order R-110 should be amended to provide a method of allocating gas between proration units in the Blanco-Mesaverde Gas Pool.

IT IS Therefore Ordered:

(1) That Order R-110 dated November 9, 1951 is hereby amended to read as follows

Section 15:- Gas Proration and Allocation

Rule 1. (a) The acreage allocated to a gas well for proration purposes shall be known as the Gas Proration Unit for that well. For the purpose of Gas allocation in the Blanco Mesaverde Gas Pool, a standard proration unit shall consist of Section 318 and 322 contiguous surface acres, substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U.S. Public Land Surveys; Provided however, that a non-standard Gas proration unit may be formed after notice and hearing or under the provision of Paragraph (b) of this rule. Any proration unit containing less than 318 acres or more than 322 acres shall be a non-standard proration unit.

The allowable production from any non-standard proration unit as compared with the allowable produc-

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 4(a) without Notice and Hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with;

1. The non-standard gas proration unit consists of contiguous quarter-quarter sections and/or lots.

2. The non-standard gas proration unit lies wholly within a single governmental section.

3. The entire non-standard gas proration unit may reasonably be presumed to be productive of gas.

4. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

5. The applicant presents written consent in the form of waivers from (a) all operators owning interests in the ~~quarter sections~~ SECTION in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit, and (b) all operators owning interests within 1500 feet of the well to which such gas proration unit is proposed to be allocated.

6. In lieu of paragraph 5 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to form such non-standard gas proration unit. The Secretary of the Commission may approve the application if, after a period of 30 days following the mailing of said notice, no operator has made objection to formation of such non-standard gas proration unit.

may be produced without waste within the ensuing proration period. "Preliminary Nominations" shall be submitted on a form prescribed by the Commission.

RULE 8. In the event a gas purchaser's market shall have increased or decreased, he may file with the Commission prior to the 10th day of the month a "supplemental" nomination, showing the amount of gas he actually in good faith desires to purchase during the ensuing proration month from the Jalmat Gas Pool. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month.

Included in the monthly proration schedule shall be (a) a summary of the total pool allocation for that month showing nominations, and adjustments made for underage or overage applied from a previous month, (b) a tabulation of the net allowable, and production for the second preceding month together with a cumulative overage or underage computation, (c) a tabulation of the current and net allowables for the preceding month, (d) a tabulation of current monthly allowables for the ensuing proration month, and (e) a tabulation of the acreage assigned each well together with a tabulation of the acreage factor assigned each well. For the purpose of allocation a proration unit of 640 acres shall be assigned an acreage factor of 4.00; a proration unit of 160 acres a factor of 1.00, etc.

"Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the Jalmat Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Jalmat Gas Pool any [illegible] it finds is being unreasonably discriminated against through denial of

therefrom if such tract were a standard unit shall be in the ratio of the area of such non-standard proration unit expressed in acres to 320 acres. Any gas proration unit containing between 318 and 322 acres shall be considered to contain 320 acres for the purpose of computing allowables.

RULE 2. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months from the ~~Arrow~~ Blanco-Mesaverde Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste within the ensuing proration period. "Preliminary Nominations" shall be submitted on a form prescribed by the Commission.

RULE 3. In the event a gas purchaser's market shall have increased or decreased, he may file with the Commission prior to the 10th day of the month a "supplemental" nomination, showing the amount of gas he actually in good faith desires to purchase during the ensuing proration month from the ~~Arrow~~ Blanco-Mesaverde Gas Pool. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month.

Included in the monthly proration schedule shall be (a) a summary of the total pool allocation for that month showing nominations, and adjustments made for underage or overage applied from a previous month, (b) a tabulation of the net allowable, and production for the second preceding month together with a cumulative overage or underage computation, (c) a tabulation of the current and net allowables for the preceding month, (d) a tabulation of current monthly allowables for the ensuing proration month, and (e) a tabulation of the acreage assigned each well. ~~together with a tabulation of the acreage factor assigned each well. For the purpose of allocation a proration unit of 640 acres shall be assigned an acreage factor of 4.00, a proration unit of 160 acres a factor of 1.00, etc.~~

"Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the ~~Arrow~~ Blanco-Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the ~~Arrow~~ Blanco-Mesaverde Gas Pool any well which it finds it being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. ~~The total allowable to be allocated to the pool each month~~

not exceeding 330 feet with respect to the required distances from the boundary lines. The maximum acreage which shall be assigned with respect to the well's location shall be as follows:

Location	Maximum Acreage
660' - 660'	160 acres
660' - 1980'	320 acres

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 5 (a) without notice and hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with;

1. The non-standard gas proration unit consists of contiguous quarter-quarter sections and/or lots.

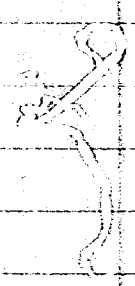
2. The non-standard gas proration unit lies wholly within a single governmental section.

3. The entire non-standard gas proration unit may reasonably be presumed to be productive of gas.

4. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

5. The applicant presents written consent in the form of waivers from (a) all operators owning interests in the quarter sections in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit, and (b) all operators owning interests within 1500 feet of the well to which such gas proration unit is proposed to be allocated.

6. In lieu of paragraph 5 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to form such non-standard gas proration unit. The Secretary of the Commission may approve the application if, after a period of 30 days following the mailing of said notice, no operator has made objection to formation of such non-standard gas proration unit.



well shall be effective on the first day of the month following receipt of the notification by the Proration Manager.

BALANCING OF PRODUCTION

RULE 9. Underproduction: The dates 7:00 a.m., January 1, and 7:00 a.m., July 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

If at the end of a proration period a marginal well has produced more than the total allowable assigned a non-marginal unit of corresponding size, the marginal well shall be reclassified as a non-marginal well and its allowable adjusted accordingly.

If during a proration period a marginal well is reworked or recompleted in such a manner that its productive capacity is increased to the extent that it should be reclassified as a non-marginal well, the reclassification shall be effective on the first day of the proration month following the date of recompletion.

The Proration Manager may reclassify a well at any time if production data or deliverability tests reflect the need for such a reclassification.

RULE 10. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced, and has not been in balance since the end of the preceding proration period, then it shall be shut in and its current monthly allowable charged against said overproduction until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 11. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 12. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 2045, Hobbs, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 13. The monthly gas production from each well shall be metered separately and the gas production therefrom shall be reported to the Commission on Form C-115 so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced.

Each purchaser or taker of gas in the Jalmat Gas Pool shall submit a report to the Commission so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was purchased or taken.

Such report shall be filed on either Form C-111 or Form C-114 (whichever is applicable) with the wells being listed in approximately the same order as they are listed on the proration schedule.

Forms C-111 and C-114 referred to herein shall be submitted in duplicate, the original being sent to the Commission at Box 871, Santa Fe, New Mexico, the other copy being sent to Box 2045, Hobbs, New Mexico.

Form C-115 shall be submitted in accordance with Rule 114 of the Commission's Rules and Regulations.

The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, treaters, compressors, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

DEFINITIONS

RULE 14. A gas well shall mean a well producing with a gas-oil ratio in excess of 100,000 cubic feet of gas per barrel of oil.

RULE 15. A well producing from the Jalmat Gas Pool and not classified as a gas well as defined in Rule 14 shall be classified as an oil well.

RULE 16. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said "taker" to submit a nomination.

RULE 17. No gas, either dry gas or casinghead gas, produced from the Jalmat Gas Pool shall be flared or vented unless specifically authorized by order of the Commission after notice and hearing.

RULE 18. Oil wells producing from the Jalmat Gas Pool shall be allowed to produce a volume of gas each day not exceeding the daily normal unit oil allowable multiplied by 10,000; provided, however, that such well shall not be allowed to produce oil in excess of the normal unit allowable as ordered by the Commission under the provisions of Rule 505.

PROVIDED FURTHER, After the effective date of this order no well shall be completed or recompleted in such a manner that the producing zone of the overlying gas pool and the producing zone of the underlying oil pool are both open in the same well bore unless specifically authorized by order of the Commission after notice and hearing. Dual completions may be effected in accordance with the provisions of Rule 112-A of the Commission's Rules and Regulations.

Any well presently completed in such a manner that the well bore is open to both the overlying gas pool and the underlying oil pool shall be assigned to either the gas pool or the oil pool by the Commission staff. Any operator of any well completed in such a manner shall submit to the Commission office at Hobbs, New Mexico, all pertinent well completion data on Form C-105, together with electric logs, sample logs, drill stem test records, etc. All data shall be submitted in duplicate on or before September 15, 1954. Failure of any operator to submit the required data will result in cancellation of Form C-110 and subsequent cancellation of allowables.

If the operator is not satisfied with the well's assignment he may apply for a hearing on the matter in accordance with Commission Rule 1203.

PROVIDED FURTHER, Gas-Oil Ratio Tests shall be taken in accordance with the provisions of Rule 301 of the Commission's Rules and Regulations.

Gas-Oil Ratio Tests shall be taken in all oil or gas pools in accordance with the attached schedule, (Exhibit H). This schedule supersedes the annual Gas-Oil Ratio test schedule previously issued only where applicable.

The operator of any oil or gas well who has submitted Form C-116 to the Commission during 1954 in compliance with the 1954 Annual Gas-Oil Ratio test schedule previously adopted is exempted from the requirement of taking another Gas-Oil Ratio test during 1954. If the test previously submitted is not complete the Proration Manager shall so advise the operator and the operator shall submit the required test in conformance with the Gas-Oil Ratio test schedule as outlined in Exhibit "H" attached hereto and made a part hereof.

PROVIDED FURTHER, That for gas allocation purposes and assignment of allowables the combination of the Jalco and Langmat gas pools to the Jalmat Gas Pool shall be effective September 1, 1954.

It is recognized that a great many wells will be reclassified and reassigned as a result of the provisions of this order and that the time involved in the reclassification may cause certain inequities; therefore, the Proration Manager is hereby directed to take such action as he deems advisable to prevent inequitable withdrawals.

PROVIDED FURTHER, That in filing Form C-101 "Notice of Intention to Drill or Recomplete" all operators shall strictly comply with the provisions of Rule 104, paragraph (e).

PROVIDED FURTHER, That failure to comply with the provisions of this order or the rules contained herein shall result in the cancellation of allowable assigned to the affected well. No further allowable shall be assigned to the affected well until all rules and regulations are complied with. The Proration Manager shall notify the operator of the well and the purchaser in writing of the date of allowable cancellation and the reason therefor.

PROVIDED FURTHER, That special pool rules applicable to the Eumont Gas Pool be, and the same hereby are promulgated as follows:

SPECIAL RULES AND REGULATIONS FOR THE EUMONT GAS POOL

Well Spacing and Acreage Requirements for Drilling Tracts.

RULE 1. Any well drilled a distance of one mile or more outside the boundary of the Eumont Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile outside the boundary of the Eumont Gas Pool shall be spaced, drilled, operated and prorated in accordance with the regulations in effect in the Eumont Gas Pool.

RULE 2. Each well drilled or recompleted within the Eumont Gas Pool on a standard proration unit after the effective date of this rule shall be drilled not closer than 1980 feet to any boundary line of the tract nor closer than 330 feet to a quarter-quarter section line or subdivision inner boundary line. Any well drilled to and producing from the Eumont Gas Pool prior to the effective date of this order at a location conforming to the spacing requirements effective at the time said well was drilled shall be considered to be located in conformance with this rule.

RULE 3. The Secretary of the Commission shall have authority to grant exception to the requirements of Rule 2 without notice and hearing where application has been filed in due form and the necessity for the unorthodox location is based on topographical conditions or is occasioned by the recompletion of a well previously drilled to another horizon.

Applicants shall furnish all operators within a 1980 foot radius of the subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all operators within such radius, together with a stipulation that proper notice has been given said operators at the addresses given. The Secretary of the Commission shall wait at least 20 days before approving any such unorthodox location, and shall approve such unorthodox location only in the

absence of objection of any offset operators. In the event an operator objects to the unorthodox location the Commission shall consider the matter only after proper notice and hearing.

RULE 4. The provision of Statewide Rule 104, Paragraph (k), shall not apply to the Eumont Gas Pool located in Lea County, New Mexico.

GAS PRORATION

RULE 5. (a) The acreage allocated to a gas well for proration purposes shall be known as the gas proration unit for that well. For the purpose of gas allocation in the Eumont Gas Pool, a standard proration unit shall consist of between 632 and 648 contiguous surface acres substantially in the form of a square which shall be a legal subdivision (section) of the U. S. Public Land Surveys with a well located at least 1980 feet from the nearest property lines; provided, however, that a non-standard gas proration unit may be formed after notice and hearing by the Commission, or under the provisions of Paragraph (b) of this Rule.

The allowable production from any non-standard gas proration unit as compared with the allowable production therefrom if such tract were a standard unit shall be in the ratio of the area of such non-standard proration unit expressed in acres to 640 acres. Any gas proration unit containing between 632 and 648 acres shall be considered to contain 640 acres for the purpose of computing allowables.

In establishing a non-standard gas proration unit the location of the well with respect to the two nearest boundary lines thereof shall govern the maximum amount of acreage that may be assigned to the well for the purposes of gas proration; provided, however, that any well drilled to and producing from the Eumont Gas Pool, as defined herein, prior to the effective date of this order at a location conforming with the spacing requirements effective at the time said well was drilled shall be granted a tolerance not exceeding 330 feet with respect to the required distances from the boundary lines. The maximum acreage which shall be assigned with respect to the well's location shall be as follows:

Location	Maximum Acreage
660' - 660'	160 acres
660' - 1980'	320 acres

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 5 (a) without Notice and Hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with;

1. The non-standard gas proration unit consists of contiguous quarter-quarter sections and/or lots.

2. The non-standard gas proration unit lies wholly within a single governmental section.

3. The entire non-standard gas proration unit may reasonably be presumed to be productive of gas.

4. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

5. The applicant presents written consent in the form of waivers from (a) all operators owning interests in the quarter sections in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit, and (b) all operators owning interests within 1500 feet of the well to which such gas proration unit is proposed to be allocated.

6. In lieu of paragraph 5 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to form such non-standard gas proration unit. The Secretary of the Commission may approve the application if, after a period of 30 days following the mailing of said notice, no operator has made objection to formation of such non-standard gas proration unit.

RULE 6. (a) The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Eumont Gas Pool and other relevant data and shall fix the allowable production of the Eumont Gas Pool.

(b) The allowable assigned to any well capable of producing its normal gas allowable in the Eumont Gas Pool shall be the same proportion of the total remaining allowable allocated to said pool after deducting allowables of marginal wells that the number of acres contained in the gas proration unit for that well bears to the acreage contained in all gas proration units assigned to non-marginal wells in the Eumont Gas Pool.

RULE 7. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months from the Eumont Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste within the ensuing proration period. "Preliminary Nominations" shall be submitted on a form prescribed by the Commission.

RULE 8. In the event a gas purchaser's market shall have increased or decreased, he may file with the Commission prior to the 10th day of the month a "supplemental" nomination, showing the amount of gas he actually in good faith desires to purchase during the ensuing proration month from the Eumont Gas Pool. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month.

Included in the monthly proration schedule shall be (a) a summary of the total pool allocation for that month showing nominations, and adjustments made for underage or overage applied from a previous month (b) a tabulation of the net allowable, and production for the second preceding month together with a cumulative overage or underage computation, (c) a tabulation of the current and net allowables for the preceding month, (d) a tabulation of current monthly allowables for the ensuing proration month, and (e) a tabulation of the acreage assigned each well together with a tabulation of the acreage factor assigned each well. For the purpose of allocation a proration unit of 640 acres shall be assigned an acreage factor of 4.00; a proration unit of 160 acres a factor of 1.00, etc.

"Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the Eumont Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Eumont Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the preliminary or supplemental nominations (whichever is applicable) together with any adjustment which the Commission deems advisable.

If during a proration month the acreage assigned a well is increased the operator shall notify the Proration Manager in writing (Box 2045, Hobbs, New Mexico) of such increase. The increased allowable assigned the gas proration unit for the well shall be effective on the first day of the month following receipt of the notification by the Proration Manager.

BALANCING OF PRODUCTION

RULE 9. Underproduction: The dates 7:00 a.m., January 1, and 7:00 a.m., July 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

If at the end of a proration period a marginal well has produced more than the total allowable assigned a non-marginal unit of corresponding size, the marginal well shall be reclassified as a non-marginal well and its allowable adjusted accordingly.

If during a proration period a marginal well is reworked or recompleted in such a manner that its productive capacity is increased to the extent that it should be reclassified as a non-marginal well, the reclassification shall be effective on the first day of the proration month following the date of recompletion.

The Proration Manager may reclassify a well at any time if production data or deliverability tests reflect the need for such a reclassification.

RULE 10. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period If, at the end of the first succeeding proration period, the well is still overproduced, and has not been in balance since the end of the preceding proration period, then it shall be shut in and its current monthly allowable charged against said overproduction until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES.

RULE 11. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 12. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 2045, Hobbs, New Mexico) by the purchaser, or the date of filing of Form C-104, and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 13. The monthly gas production from each gas well shall be reported separately and the gas production therefrom shall be reported to the Commission on Form C-115 so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced.

Each purchaser or taker of gas in the Eumont Gas Pool shall submit a report to the Commission so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was purchased or taken.

Such report shall be filed on either Form C-111 or Form C-114 (whichever is applicable) with the wells being listed in approximately the same order as they are listed on the proration schedule.

Forms C-111 and C-114 referred to herein shall be submitted in duplicate, the original being sent to the Commission at Box 871, Santa Fe, New Mexico, the other copy being sent to Box 2045, Hobbs, New Mexico.

Form C-115 shall be submitted in accordance with Rule 1114 of the Commission's Rules and Regulations.

The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, treaters, compressors, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

DEFINITIONS

RULE 14. A gas well shall mean a well producing with a gas-oil ratio in excess of 100,000 cubic feet of gas per barrel of oil.

RULE 15. A well producing from the Eumont Gas Pool and not classified as a gas well as defined in Rule 14 shall be classified as an oil well.

RULE 16. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said "taker" to submit a nomination.

RULE 17. No gas, either dry gas or casinghead gas, produced from the Eumont Gas Pool shall be flared or vented unless specifically authorized by order of the Commission after notice and hearing.

RULE 18. Oil wells producing from the Eumont Gas Pool shall be allowed to produce a volume of gas each day not exceeding the daily normal unit oil allowable multiplied by 10,000; provided, however, that such well shall not be allowed to produce oil in excess of the normal unit allowable as ordered by the Commission under the provisions of Rule 505.

PROVIDED FURTHER, That special pool rules applicable to the Arrow Gas Pool be, and the same hereby are promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE ARROW GAS POOL

Well Spacing and Acreage Requirements for Drilling Tracts.

RULE 1. Any well drilled a distance of one mile or more outside the boundary of the Arrow Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile outside the boundary of the Arrow Gas Pool shall be spaced, drilled, operated and prorated in accordance with the regulations in effect in the Arrow Gas Pool.

RULE 2. Each well drilled or recompleted within the Arrow Gas Pool on a standard proration unit after the effective date of this rule shall be drilled not closer than 1980 feet to any boundary line of the tract nor closer than 330 feet to a quarter-quarter section line or subdivision inner boundary line. Any well drilled to and producing from the Arrow Gas Pool prior to the effective date of this order at a location conforming to the spacing requirements effective at the time said well was drilled shall be considered to be located in conformance with this rule.

RULE 3. The Secretary of the Commission shall have authority to grant exception to the requirements of Rule 2 without notice and hearing where application has been filed in due form and the necessity for the unorthodox location is based on topographical conditions or is occasioned by the recompletion of a well previously drilled to another horizon.

Applicants shall furnish all operators within a 1980 foot radius of the subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all operators within such radius, together with a stipulation that proper notice has been given said operators at the addresses given. The Secretary of the Commission shall wait at least 20 days before approving any such unorthodox location, and shall approve such unorthodox location only in the absence of objection of any offset operators. In the event an operator objects to the unorthodox location the Commission shall consider the matter only after proper notice and hearing.

RULE 4. The provisions of Statewide Rule 104, Paragraph (k), shall not apply to the Arrow Gas Pool located in Lea County, New Mexico.

GAS PRORATION

RULE 5. (a) The acreage allocated to a gas well for proration purposes shall be known as the gas proration unit for that well. For the purpose of gas allocation in the Arrow Gas Pool, a standard proration unit shall consist of between 632 and 648 contiguous surface acres substantially in the form of a square which shall be a legal subdivision (section) of the U. S. Public Land Surveys with a well located at least 1980 feet from the nearest property lines; provided, however, that a non-standard proration unit may be formed after notice and hearing by the Commission, or under the provisions of Paragraph (b) of this Rule.

The allowable production from any non-standard gas proration unit as compared with the allowable production therefrom if such tract were a standard unit shall be in the ratio of the area of such non-standard proration unit expressed in acres to 640 acres. Any gas proration unit containing between 632 and 648 acres

shall be equal to the sum of the preliminary or supplemental nominations (whichever is applicable) together with any adjustment which the Commission deems advisable.

If during a proration month the acreage assigned a well is increased the operator shall notify the Proration Manager in writing (Box 2045, Hobbs, New Mexico) of such increase. The increased allowable assigned the gas proration unit for the well shall be effective on the first day of the month following receipt of the notification by the Proration Manager.

BALANCING OF PRODUCTION

RULE 9. Underproduction: The dates 7:00 a.m., January 1, and 7:00 a.m., July 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

If at the end of a proration period a marginal well has produced more than the total allowable assigned a non-marginal unit of corresponding size, the marginal well shall be reclassified as a non-marginal well and its allowable adjusted accordingly.

If during a proration period a marginal well is reworked or recompleted in such a manner that its productive capacity is increased to the extent that it should be reclassified as a non-marginal well, the reclassification shall be effective on the first day of the proration month following the date of recompletion.

The Proration Manager may reclassify a well at any time if production data or deliverability tests reflect the need for such a reclassification.

RULE 10. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced, and has not been in balance since the end of the preceding proration period, then it shall be shut in and its current monthly allowable charged against said overproduction until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES.

RULE 11. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 12. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 2045, Hobbs, New Mexico) by the purchaser, or the date of filing of Form C-104, and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 13. The monthly gas production from each gas well shall be metered separately and the gas production therefrom shall be reported to the Commission on Form C-115 so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced.

Each purchaser or taker of gas in the Arrow Gas Pool shall submit a report to the Commission so as to reach the Commission on or before the 20th day of the month next succeeding the month in which the gas was purchased or taken.

Such report shall be filed on either Form C-111 or Form C-114 (whichever is applicable) with the wells being listed in approximately the same order as they are listed on the proration schedule.

Forms C-111 and C-114 referred to herein shall be submitted in duplicate, the original being sent to the Commission at Box 871, Santa Fe, New Mexico, the other copy being sent to Box 2045, Hobbs, New Mexico.

Form C-115 shall be submitted in accordance with Rule 1114 of the Commission's Rules and Regulations.

The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, treaters, compressors, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

DEFINITIONS

RULE 14. A gas well shall mean a well producing with a gas-oil ratio in excess of 100,000 cubic feet of gas per barrel of oil.

RULE 15. A well producing from the Arrow Gas Pool and not classified as a gas well as defined in Rule 14 shall be classified as an oil well.

RULE 16. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said "taker" to submit a nomination.

RULE 17. No gas, either dry gas or casinghead gas, produced from the Arrow Gas Pool shall be flared or vented unless specifically authorized by order of the Commission after notice and hearing.

RULE 18. Oil wells producing from the Arrow Gas Pool shall be allowed to produce a volume of gas each day not exceeding the daily normal unit oil allowable multiplied by 10,000; provided, however, that such well shall not be allowed to produce oil in excess of the normal unit allowable as ordered by the Commission under the provisions of Rule 505.

EXHIBIT "A"

Horizontal limits of the Jalmat Gas Pool

Township 21 South, Range 36 East
All of Section 31
SW/4 of Section 32
All of Secs. 33 and 34

Township 22 South, Range 35 East
E/2 Section 13

Township 22 South, Range 36 East
All of Secs. 3 through 10, inclusive.
W/2 Sec. 11
W/2 Section 14
All of Secs. 15 through 18, inclusive
NE/4 Sec. 19
All of Secs. 20 through 23, inclusive
W/2 Sec. 24
All of Secs. 25 through 29, inclusive
All of Secs. 32 through 36, inclusive

Township 22 South, Range 37 East
SW/4 Sec. 31

Township 23 South, Range 36 East
All of Secs. 1 through 4, inclusive
N/2 and SE/4 Sec. 5
E/2 Sec. 8
All Secs. 9 through 16, inclusive
NE/4 Sec. 17
All Secs. 21 through 27, inclusive
E/2 Sec. 28
E/2 Sec. 33
All Secs. 34, 35 and 36

Township 23 South, Range 37 East
All Secs. 6, 7, S/2 Sec. 8
All Secs. 17 throgh 21, inclusive
All of Secs. 28 through 33, inclusive

Township 24 South, Range 36 East
All of Secs. 1, 2, and 3
E/2 Sec. 4
NE/4 Sec. 9
N/2, SE/4 Sec. 10
All of Secs. 11 through 14, inclusive

Exhibit "A" (Cont'd)

Township 24 South, Range 36 East (cont'd)
E/2 Sec. 15
All Secs. 22 through 26, inclusive
E/2 Sec. 27
E/2 Sec. 34
All Secs. 35 and 36

Township 24 South, Range 37 East
All of Secs. 5, 6, 7 and 8
W/2 Sec. 9
W/2 Sec. 16
All of Secs. 17 through 23, inclusive
All of Secs. 26 through 35, inclusive

Township 25 South, Range 36 East
All of Sec. 1
N/2 Sec. 2
All of Secs. 12, 13, 24 and 25
NE/4 Sec. 36

Township 25 South, Range 37 East
All Sec. 2 through 33, inclusive
W/2 Sec. 34

Township 26 South, Range 37 East
W/2 Sec. 3
All Secs. 4 through 9, inclusive
W/2 Sec. 10
All of Secs. 15 through 22, inclusive
All Secs. 27, 28 and 29
N/2, SE/4 Sec. 30
E/2 Sec. 31
All of Secs. 32, 33 and 34

EXHIBIT "B"

Horizontal limits of the Eumont Gas Pool

Township 19 South, Range 36 East
All of Secs. 12, 13, 14, 23, 24, 25, 26
E/2 Sec. 27
E/2 Sec. 34
All of Secs. 35 and 36

Township 19 South, Range 37 East
W/2 Sec. 4
E/2 Sec. 5
All of Secs. 7, 8, 17, 18, 19, 20
W/2 Sec. 9
W/2 Sec. 21
W/2 Sec. 27
All of Secs. 28, 29, 30, 31, 32, 33 and 34

Township 20 South, Range 36 East
All of Secs. 1, 2
E/2 Sec. 3
E/2 Sec. 10
All of Secs. 11, 12, 13 and 14
NE/4 Sec. 15
N/2 and SE/4 Sec. 23
All of Secs. 24 and 25
E/2 Sec. 26
E/2 Sec. 35
All Sec. 36

Township 20 South, Range 37 East
W/2 Sec. 2
All of Secs. 3 through 10, inclusive
W/2 Sec. 11
All of Secs. 15 through 22, inclusive
S/2 Sec. 23
All of Secs. 26 through 35, inclusive
W/2 Sec. 36

Township 21 South, Range 35 East
All of Sec. 1
SE/4 Sec. 2
NE/4 Sec. 11
All of Sec. 12
All of Secs. 13 and 24

EXHIBIT "B" (cont'd)

Township 21 South, Range 36 East

All of Secs. 1 through 21, inclusive
N/2 and SW/4 Sec. 22
W/2 Sec. 27
All of Secs. 28, 29 and 30
N/2 and SE/4 Sec. 32

Township 21 South, Range 37 East

All of Secs. 7 and 18

EXHIBIT "C"

Township 21 South, Range 36 East
SE/4 Sec. 24
All Sec. 25
E/2 Sec. 26
NE/4 and S/2 Sec. 35
All Sec. 36

Township 22 South, Range 36 East
All of Secs. 1 and 2
NE/4 Sec. 11
All of Sec. 12
N/2 and SE/4 Sec. 13

Township 22 South, Range 37 East
W/2 Sec. 7
All Sec. 18
N/2 Sec. 19

EXHIBIT "D"

Horizontal limits of the Eunice-Monument Oil Pool

Township 19 South, Range 36 East

E/2 Sec. 12
All of Sec. 13
All Secs. 23 through 27, inclusive
All Secs. 34, 35 and 36

Township 19 South, Range 37 East

SW/4 Sec. 3
S/2 Sec. 4
All of Secs. 7 and 8
W/2 Sec. 9
W/2 Sec. 16
All Secs. 17 through 21, inclusive
S/2 Sec. 27
All Secs. 28 through 34, inclusive

Township 20 South, Range 36 East

All Secs. 1, 2 and 3
All Secs. 10 through 14, inclusive
E/2 Sec. 15
All Secs. 23 through 26, inclusive
E/2 Sec. 27
All Secs. 35 and 36

Township 20 South, Range 37 East

All Secs. 3 through 10, inclusive
All Secs. 15 through 21, inclusive
W/2 Sec. 22
All Secs. 29 through 33, inclusive

Township 21 South, Range 35 East

All Secs. 1, 12, 13, 24
E/2 Sec. 25

Township 21 South, Range 36 East

SW/4 Sec. 1
All of Secs. 2 through 11, inclusive
W/2 Sec. 12
W/2 Sec. 13
All Sec. 14 through 22, inclusive
NW/4 Sec. 23
W/2 Sec. 27
All Secs. 28, 29 and 30
N/2 and SE/4 Sec. 32
All Sec. 33
W/2 Sec. 34

EXHIBIT "E"

Horizontal limits of the Cooper-Jal Oil Pool

Township 23 South, Range 36 East
All of Secs. 4, 5, 8, 9, 15, 16, 17, 20, 21, 22, 27, 28, 33 and 34

Township 24 South, Range 36 East
W/2 Sec. 2
All of Secs. 3 and 4
N/2 Sec. 9
All Sec. 10
W/2 Sec. 11
SW/4 Sec. 13
All Secs. 14 and 15
All Secs. 22, 23
NW/4 and W/2 SW/4 Sec. 24
W/2 Sec. 25
All Secs. 26, 27, 34 and 35
W/2 Sec. 36

Township 25 South, Range 36 East
All Secs. 1, 2, 3, 11, 12, 13, 14, 23, 24, 25, 26 and 36

Township 25 South, Range 37 East
SW/4 Sec. 6
W/2 Sec. 7
W/2 Sec. 18
W/2 and W/2 E/2 Sec. 19
W/2 Sec. 30
All Sec. 31
SW/4 Sec. 32

EXHIBIT "F"

Horizontal limits of the Langlie-Mattix Oil Pool

Township 23 South, Range 36 East
All of Secs. 1, 2, 3, 10, 11, 12, 13, 14, 23, 24, 25, 26, 35 and 36

Township 23 South, Range 37 East
W/2 Sec. 6
All of Secs. 7, 18, 19
W/2 W/2 Sec. 26
All Sec. 27
S/2 Sec. 28
All Secs. 29 through 35, inclusive

Township 24 South, Range 36 East
All Sec. 1
E/2 Sec. 2
E/2 Sec. 11
All Sec. 12
N/2 and SE/4 Sec. 13
E/2 and E/2 SW/4 Sec. 24
E/2 Sec. 25
E/2 Sec. 36

Township 24 South, Range 37 East
All of Secs. 2 through 11, inclusive
All of Secs. 14 through 23, inclusive
SW/4 Sec. 25
All Secs. 26 through 35, inclusive
W/2 Sec. 36

Township 25 South, Range 37 East
All of Secs. 2 through 5, inclusive
N/2 and SE/4 Sec. 6
E/2 Sec. 7
All of Secs. 8 through 11, inclusive
W/2 Sec. 13
All Secs. 14 through 17, inclusive
E/2 Sec. 18
E/2 E/2 Sec. 19
All Secs. 20 through 23, inclusive
W/2 Sec. 24
All Sec. 25
All Secs. 26 through 29, inclusive
E/2 Sec. 30
N/2, SE/4 Sec. 32
All Secs. 33, 34 and 35
W/2 Sec. 36

EXHIBIT "F" (Cont'd)

Township 26 South, Range 37 East
NW/4 Sec. 1
NE/4 Sec. 2

EXHIBIT "G"

Horizontal limits of the South Eunice Oil Pool

Township 21 South, Range 35 East
E/2 Sec. 36

Township 21 South, Range 36 East
All Sec. 31
SW/4 Sec. 32

Township 22 South, Range 35 East
E/2 Sec. 1

Township 22 South, Range 36 East
W/2 Sec. 3
All Secs. 4 through 10, inclusive
SW/4 Sec. 11
W/2 Sec. 14
All Secs. 15 through 23, inclusive
All Secs. 25 through 29, inclusive
E/2 Sec. 30
NE/4 Sec. 31
All Secs. 32 through 36, inclusive

EXHIBIT "H"
GAS-OIL RATIO TEST SCHEDULE

NAME OF POOL	GOR LIMIT	TEST PERIOD			DEADLINE FOR FILING FORM C-116
Oil Pools					
Arrowhead	3500	Nov.	Dec.		Jan. 15, 1955
Cooper-Jal	10000	Sept.			October 15, 1954
Eunice	6000	Oct.	Nov.	Dec.	January 15, 1955
Monument	3000	July	Aug.	Sept.	October 15, 1954
South Eunice	10000	Sept.	Oct.		November 15, 1954
Hardy	10000	Sept.	Oct.		November 15, 1954
Langlie-Mattix	10000	Sept.			October 15, 1954
Leonard	10000	Sept.			October 15, 1954
South Leonard	10000	Sept.			October 15, 1954
Penrose-Skelly	10000	Sept.	Oct.	Nov.	December 15, 1954
Rhodes	10000	Sept.	Oct.		November 15, 1954
Gas Pools					
Arrow	10000	Oct.	Nov.		December 15, 1954
Eumont	10000	Oct.	Nov.	Dec.	January 15, 1955
Jalmat	10000	Sept.	Oct.	Nov.	December 15, 1954

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

W. B. MACEY, Member and Secretary

S E AL

Skelly Ent #9

PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1 000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that pericd, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

FORM 1029 1-51

STANOLIND OIL AND GAS COMPANY

OIL AND GAS BUILDING

FORT WORTH, TEXAS

JAMES K. SMITH
DIVISION ATTORNEY

MAIN OFFICE OCC
1954 JUL 9 AM 8:49

July 6, 1954

Statement of Stanolind Oil and Gas Company
In re: Gas Proration - Blanco-Mesa Verde
Pool - Case Nos. 330 and 330-A.

Oil Conservation Commission
of the State of New Mexico
Santa Fe, New Mexico

Attention: Mr. R. R. Spurrier, Secretary

Gentlemen:

In accordance with the suggestion of the Commission, we are submitting herein a written statement with reference to the proration of gas and the allocation factors to be used in the Blanco-Mesa Verde Pool.

It appears that all parties interested in the proceedings assume the necessity for gas proration in the Blanco-Mesa Verde Pool, and the evidence in the record supports such position. The difficulty appears to lie altogether in the proper manner of allocating the gas to be prorated.

For consideration at this time by the Commission is the propriety of the size of the proration unit for the Blanco-Mesa Verde Pool. In Case No. 317, Order R-110, promulgated November 9, 1951, the Commission established the size of the proration unit for the Blanco-Mesa Verde Pool as consisting of 320 acres, or a legal United States General Land Office survey half-section following the usual legal subdivision of such Land Office survey and permitting also exceptions for contiguous tracts of approximately 320 acres following regular Land Office subdivision. Testimony at the Hearing just concluded supported the efficient and economic drainage area of 320 acres, and the suggestion was made that tolerance be permitted without penalty or bonus in those instances

where the number of acres included within the proration unit does not exceed 325 acres and is not less than 315 acres. No contest of this suggestion appears to have been made at the Hearing.

Another factor to be considered by the Commission is the establishment of balancing periods and the establishment also of the respective dates for each balancing period. So far as Stanolind Oil and Gas Company is concerned, this matter appears to be primarily of interest to the purchasing companies, and we have no comment to make with reference thereto. However, your attention is directed to Section 12 (c) of the Act of 1949, Chapter 168, relating to the conservation of oil and gas, which provides that the Commission shall fix proration periods of not less than six months.

As stated heretofore, the primary controversy appears to be centered around the proper allocation formula to be used by the Commission. The recommendations made by several of the companies appear to vary from allocation based entirely upon acreage, to allocation based upon acreage times deliverability. Some evidence was submitted recommending both minimum and maximum allowables. The latter recommendation appears to be inconsistent with the positions taken by the companies supporting an allocation formula which includes a deliverability factor. The varying positions taken by certain of the companies may be briefly stated as follows:

Skelly Oil Company took the position that the allocation should be based entirely upon acreage; injecting, however, the recommendation that bottom hole pressures be used as the factor in permitting variance of allowables between wells. Skelly's approach is essentially negative, in that attempt was made to establish that disparity of reserves in the field could not possibly be as high as the range in deliverabilities, and that allowance of a variable factor based upon bottom hole pressures would permit some variation but would not be as high as the variance indicated by use of deliverability

as the sole variable factor. According to their testimony, allocation on the basis of bottom hole pressures would permit a variance on the order of 1.84 to 1. Other testimony in the record indicates that such a formula does not do justice to known disparity in reserves between the respective proration units.

At this point, the Commission's attention is directed to Section 13 (a) of the Act of 1949, Chapter 168, as amended, which requires that proration be established on a basis of recoverable reserves. It is obvious that a proration unit which has no well upon it should not be assigned an allowable. It is equally obvious that ability to deliver gas is a factor which the Legislature had in mind in making a determination with respect to the allocation formula to be used by the Commission. On this question, Section 12 (c) of the 1949 Act specifies that the Commission may give equitable consideration to acreage, pressure, open flow, porosity, permeability, deliverability and quality of gas, and to such other pertinent factors as may from time to time exist. It is significant that thickness of sand is not specifically named. Applying the rule of "ejusdem generis" it appears to be quite clear that the Legislature intended that proration should be primarily controlled by the ability of a well to deliver gas. Testimony was in conflict with respect to whether or not the deliverability of a well had any relation to recoverable reserves. This argument appears to be foreclosed by the specific direction contained in Section 12 (c) of the 1949 Act. Furthermore, I believe it can be stated definitely, that gas in place as measured by sand thickness has only indirect relationship to recoverable reserves. Thus, sand thickness and testimony based thereon should not be considered by the Commission unless such testimony is tied in with the ability to recover the gas from the sand. Bottom hole pressures are a function primarily of gas in place; thus, the use of bottom hole pressures as of a given date, without comparison to some other date and some other pressure is not

significant with respect to the amount of recoverable reserves that can be obtained.

Pubco Development Corporation took the position that the allocation factor should be based on 100% deliverability times acreage. Its testimony was directed to the proposition that the Blanco-Mesa Verde reservoir was not a homogeneous mass, but was composed of various lenticular sands, and that there was communication between proration units with respect to certain of the sands but that there were no uniform stringers or lenses to be observed throughout the entire field. The effect of the testimony was to indicate impairment of the free flow of gas across the field, and that the drainage from one unit to another would be impeded because of lack of direct communication. By pyramiding variable factors which were stated to exist in the field, including variances in sand thickness, porosity, connate water saturation, and initial bottom hole pressures, Pubco contended that reserves for individual wells drilled in the pool could vary as much as 46.4 to 1. The effect of this testimony was to support deliverability as the sole variable factor to be considered by the Commission in establishing its allocation of gas. Further testimony was advanced by Pubco Development Corporation that initial variances in potential throughout the field was on the order of 33 to 1, which was well within the maximum possible variation of 43.4 to 1 as stated previously. Although this approach is also negative, in that the possibility of larger differentials in recoverable reserves justifies a proration formula based on initial potential and deliverability since it was demonstrated that such latter differential would be less than the possibility, this approach appears to be more logical than a position which would limit the differential in allowables to one factor only, namely, thickness of gross or net pay. Pubco recommended that the allocation formula be based entirely upon deliverability of the well against the acreage factor.

Phillips Petroleum Company took essentially the same position as Skelly Oil Company; advancing, however, an allocation factor of acreage times 75% acreage plus

25% deliverability. Testimony was advanced that the maximum differential net pay sand thickness was on the order of 3.55 to 1, and that any allocation formula which would permit a well to produce over 3½ times the production of any other commercial well in the field would inevitably result in impairing correlative rights. The selection by Phillips of a deliverability factor in the recommended allocation formula was in direct conflict to the testimony of its witnesses who stated unequivocally that deliverability had no relation to reserves. In addition to being contrary to Statutory requirements, Phillips position is inconsistent, in that it first rejects deliverability as a factor to be considered by the Commission then injects a low deliverability factor for purposes of adjustment between wells purely because of expediency. Phillips recognizes that reserves can vary from well to well, but does not by affirmative testimony attempt to support any basis for allocation from well to well except that of deliverability. It could well be argued, based on testimony advanced by Phillips, which was purely negative, that the Commission could easily assign allowables based upon the current market quotation of the Company's stock provided such allowable did not exceed the maximum ratio of 3.55 to 1. Furthermore, examination of Phillips' own exhibits (Phillips Exhibits 3 and 7) and the admission of its own witness, clearly indicates that the recommendation of 75% acreage plus 25% deliverability times acreage would discriminate in favor of the weaker wells in the field insofar as 97% of the wells in the field are concerned. Using Phillips own exhibits again, and testimony of its witness, we find that use of 50% acreage plus 50% deliverability times acreage again results in discrimination among 97% of the wells in the field. In this connection your attention is directed to the testimony of Mr. Cullender, during the course of which he testified that the use of the formula based on 25% acreage plus 75% deliverability times acreage, would result in a disparity of something less than 6 to 1 for 97% of the wells. In this connection attention is directed to the testimony placed in the record by the Commission's witness to the effect that based on

thickness alone you could have a disparity of as much as 5½ to 1. Each of the Commission's witnesses testified that the approach they took was on the most conservative basis. The Commission should bear in mind that in allocating the gas to be produced the Commission should not utilize the most conservative basis for the establishment of recoverable reserves, but should attempt to give full weight to all factors which are known to exist so as to allocate the gas upon as fair a basis as possible. Thus, some weight, of necessity, must be given to the known variances in permeability, connate water saturation, and porosity, all of which must be taken into consideration in determining the amount of recoverable reserves. In my opinion, the testimony in the record sustains a differential well in excess of 10 to 1 throughout the entire pool. It, therefore, appears to me that based upon Phillips own testimony that the minimum allowance for deliverability should be on the order of 75% deliverability times acreage plus 25% acreage.

El Paso Natural Gas Company took the position that there was a direct relationship between the initial potential of the well and the net effective pay. So far as we can ascertain, from the record made before the Commission, this testimony is the only testimony which affirmatively establishes a connection between recoverable reserves and an allocation formula. The testimony supports the validity of an order of the Commission which will establish the variances in allowables based upon initial potential followed by deliverability tests. El Paso recommended that the allowable be based upon 75% deliverability times acreage plus 25% acreage. It is our opinion that the only order which the Commission may enter which will be supported by substantial evidence is an order which will give full weight to deliverability. Stanolind Oil and Gas Company supports the position taken by El Paso that the allocation of gas should be on a basis of 100% deliverability times acreage. means after completion practices increase and main direct proportion to increase in Del. Cannot consider at Present

Southern Union Gas Company took the position that the allocation formula should be on the basis of 50% deliverability times acreage plus 50% acreage. Cross examination developed, however, that Southern Union's investigation and testimony was based entirely upon reserves in place. Because of the statement by the witness for Southern Union that if the Commission is required to allocate gas based on recoverable reserves that such requirement would alter his conclusions, it is my opinion that the Commission is required to disregard all of the testimony advanced by Southern Union Gas Company. However, it may be stated that Southern Union's position was essentially that of Skelly and Phillips, in that it recommended that the Commission utilize arbitrary factors which would result in a differential lower than that considered by each of the companies to represent the variances in reserves in place. The comments heretofore made, therefore, with respect to this negative approach would apply also to the position taken by Southern Union.

Southern Union recommended, also, that the Commission consider the imposition of maximum and minimum allowables. We should like to join with Southern Union with respect to the imposition of a minimum allowable, but suggest to the Commission that the minimum allowable should take into consideration economic factors relating to continued profitable operations. The question of incentive discussed by Southern Union's witness does not appear to be a matter which should concern the Commission in that we do not believe that any person would drill a gas well just for the purpose of acquiring a minimum allowable with a payout of six years. It appears that the net effect of arguing for minimum allowables from the standpoint of incentive is to place the Commission in the position of insuring profitable operations, including drilling. In this connection, Section 13 (d) of the 1949 Act stresses continued operation and premature abandonment as the criteria to be followed by the Commission. [illegible]

With respect to maximum allowables it is our feeling that such recommendation be disregarded by the Commission as unduly hampering the delivery of gas, and on the testimony before the Commission in this case would of necessity be arbitrary. Certainly the selection of a six-year payout figure is arbitrary and has no reasonable relationship to whether or not a person would or would not drill a well or would or would not continue to operate the well. However, if the Commission feels that the record as made reflects a need to limit the few wells in the field which show a great disparity from the average, either because of a belief that the deliverability tests are not accurate or because of the belief that the tests do not truly represent the correct disparity in recoverable reserves, then the maximum allowable could possibly be supported by the record, but it would not be supported at the 2½ million cubic feet per day recommended by Southern Union. Furthermore, it is our considered opinion that the imposition of a maximum allowable would require that the maximum be flexible and bear some relationship to the total allowables granted for the entire field; otherwise, its imposition defeats the entire purpose of allocating gas so as to supply the market and so as to give effect to the recoverable reserves in the field.

If the Commission should determine that maximum allowables should be imposed, it is our considered opinion that the use of any allocation formula between proration units other than of 100% deliverability times acreage would be arbitrary and capricious. The record does not indicate that any substantial number of wells have such a great disparity in deliverability from the average so as to materially affect the total quantity of gas to be produced by such high productive wells. If a maximum allowable is imposed, then in order to give proportionate adjustments among the wells in the field the formula would require the use of 100% deliverability as a factor, after the top productive wells have been so limited.

In conclusion, it is our recommendation that the Commission adopt the only formula supported by the evidence in the record, namely, 100% deliverability times acreage. This position is the one taken by Stanolind Oil and Gas Company at the time this matter was first heard by the Commission, and we have seen no evidence and know of no evidence which has altered the conclusion made at that time. Commenting briefly upon the concession made by El Paso, that they would accept a formula of 75% deliverability times acreage plus 25% acreage, I consider that such concession is purely in the nature of compromise, and is not supported by the record. Although we are interested in maintaining a fair and consistent position before the Commission, we cannot in the face of the record recommend the adoption of any formula other than 100% deliverability times acreage.

We are attaching a copy of proposed Rules for your consideration.

Respectfully submitted,

James K. Smith

JAMES K. SMITH
Division Attorney
STANOLIND OIL AND GAS COMPANY

JKS:rb

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION
OF STANOLIND OIL AND GAS COMPANY FOR
THE AMENDMENT OF ORDER NO. R-110,
DATED NOVEMBER 9, 1951, RELATING TO
THE BLANCO (MESAVERDE) POOL,
SAN JUAN COUNTY, NEW MEXICO

ORDER OF THE COMMISSION

BY THE COMMISSION:

This case came on for hearing at _____ o'clock a.m. on _____, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this _____ day of _____, 19____, the Commission, a quorum being present, having considered the testimony adduced, the exhibits received, the statements of interested parties, the official records of this Commission and other pertinent data, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given, the Commission has jurisdiction of this cause.

(2) That the Commission, for the purpose of preventing waste and for the protection of correlative rights, should amend Order No. R-110 to provide for a definite method of allocating gas between proration units in the pool.

IT IS THEREFORE ORDERED:

That Section 11 of Commission Order R-110, dated November 9, 1951, is hereby amended to read as follows:

SECTION 11 - GAS WASTAGE:

Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut-in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

A. The Commission, after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Gas Pool, and other relevant data, and shall fix the allowable production of the Blanco Gas Pool, and shall allocate production among the gas wells in the Blanco Gas Pool upon a reasonable basis with due regard to correlative rights.

B. PRORATION UNITS

(1) For the purpose of gas allocation in the Blanco Gas Pool, a standard proration unit shall consist of between 318 and 322 contiguous surface acres substantially in the form of a rectangle, which shall be a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit not conforming to the above requirements may be formed after notice and hearing by the Commission or as outlined in Paragraph (2). Any proration unit containing less than 318 acres or more than 322 acres shall be a non-standard unit and its allowable shall be decreased or increased to that proportion of the standard unit allowable that the number of acres contained therein bears to 320 acres. Any standard

proration unit consisting of between 318 and 322 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

(2) The Secretary of the Commission shall have authority to grant an exception to Paragraph B(1) without notice and hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of less acreage than a standard proration unit.

(b) The acreage assigned to the non-standard unit lies wholly within a legal half section and contains a well capable of producing gas into a gas transportation facility on the date of this order.

(c) The operator receives written consent in the form of waivers from all operators in the adjoining 320-acre proration units.

C. At least 30 days prior to the beginning of each gas proration period, the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste within the ensuing proration period. "Preliminary Nominations" shall be submitted on a form prescribed by the Commission.

D. Each month, the Commission shall cause to be submitted by each gas purchaser its "Supplemental Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration month from the Blanco Gas Pool. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month together with an adjusted allowable computation for the second preceding month. Said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowables assigned the top allowable units shall be reduced proportionately, and in the event the allowable assigned is less than the production, then the allowables assigned the top allowable units shall be increased proportionately. "Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the Blanco Gas Pool delivering to a gas transportation facility or lease gathering system, and shall include in the proration schedule of the Blanco Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the supplemental nominations together with any adjustment which the Commission deems advisable. The allocation to a pool remaining after subtracting the capacity of marginal units shall be divided and allocated ratably among the non-marginal units in the proportion that the product of the acreage times the deliverability contained in each unit bears to the summation of the products of these factors for all such proration units in the field, provided that the Commission shall set a minimum allowable, to be determined after study of deliverability tests and other factors, which shall be allocated to any well whose allowable as calculated by the method outlined above is a lesser figure.

E. Underproduction: The dates 7:00 A.M., January 1, and 7:00 A.M. July 1, shall be known as balancing dates, and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled. If at the end of the first succeeding proration period, a greater amount of allowable remains unproduced than was carried forward as underproduction, the amount carried forward to the second succeeding period shall be the total underproduction less the amount carried forward to the first succeeding period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

F. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced, it shall be shut in and its current monthly allowable charged against said overproduction until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

G. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

H. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

I. The monthly gas production from each gas well shall be metered separately and the gas production therefrom shall be submitted to the Commission on Form C-115 so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, treaters, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

J. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said "taker" to submit a nomination.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

R. R. SPURRIER, Member and Secretary

Case 330 A

MAIN OFFICE OCC

JONES, HARDIE, GRAMBLING & HOWELL
ATTORNEYS AND COUNSELORS AT LAW
SEVENTH FLOOR BASSETT TOWER
EL PASO, TEXAS

CYRUS H. JONES, 1868-1952
THORNTON HARDIE
ALLEN R. GRAMBLING
BEN R. HOWELL
HAROLD L. SIMS
WILLIAM B. HARDIE
JOHN A. GRAMBLING
R. H. FEUILLE

1954 JUL 12 AM 9:12

July 7, 1954

1954 JUL 12 AM 9:17

MAIN OFFICE OCC

R. R. Spurrier, Secretary and Director
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Dick:

Thank you for your letter of June 30. I am pleased to note that the Associated Press did not quote you correctly. I rarely pay much attention to newspaper articles, particularly such as those emanating from Professor Ximenes. However, I do become seriously concerned about a direct quote from a responsible person.

I listed a number of companies. Stanolind's position was definitely stated. The other companies listed were either represented at the hearing by persons who supported the high deliverability formula or who wrote letters giving the Commission their views. Many of the companies were kind enough to send me copies of the letters written the Commission. I think a tabulation of all parties expressing a preference will disclose an overwhelming majority of operators in favor of high deliverability formula.

I am enclosing a brief written argument and suggested rules submitted by El Paso Natural Gas Company.

I look forward to seeing you next week. With best personal regards,

Yours sincerely,

Ben R. Howell

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enc.

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

STANOLIND OIL AND GAS COMPANY'S APPLICATION FOR AMENDMENT OF ORDER R-110 RELATING TO THE BLANCO-MESAVERDE POOL, SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO, CONSOLIDATED WITH THE COMMISSION'S APPLICATION UPON ITS OWN MOTION TO CONSIDER AN ORDER PROMULGATING RULES AND REGULATIONS FOR THE BLANCO-MESAVERDE GAS POOL	CASES NOS. 330 AND 330-A

EL PASO NATURAL GAS COMPANY'S WRITTEN ARGUMENT

In approaching the problem of proration in the San Juan Basin, the basis of any proration order or proration rules must be the Statute. As the Commission well knows, the New Mexico Statute directs as follows:

> "In protecting correlative rights, the Commission may give equitable consideration to acreage, pressure, open flow, porosity, permeability, deliverability and quality of the gas and to such other pertinent factors as may from time to time exist, and in so far as is practicable, shall prevent drainage between producing tracts in a pool which is not equalized by counter-drainage." Section 12(c)

> "The rules, regulations or orders of the Commission shall, so far as it is practicable to do so, afford to the owner of each property in a pool the opportunity to produce his just and equitable share of the oil or gas, or both, in the pool, being an amount, so far as can be practically determined, and so far as such can be practicably obtained without waste, substantially in the proportion that the quantity of the recoverable oil or gas, or both, under such property bears to the total recoverable oil or gas or both in the pool, and for this purpose to use his just and equitable share of the reservoir energy." Section 13(a) (underscoring ours)

The statutory directions have two points of special significance in this hearing: First, the protection of correlative rights and prevention of drainage must be tempered by that which is practicable; Second, consideration shall be given to recoverable gas rather than to gas in place.

We find no definition of "recoverable gas" in the Statute. A reasonable interpretation must mean the quantity of gas which can be recovered economically and which can be marketed at the time the gas production from the entire pool is being marketed. Gas reserves attributable to low deliverability wells admittedly cannot be fully marketed during the same time period as wells of higher deliverabilities. The practical operations of marketing gas require that gas be produced, transported and sold at the time the market exists. The millions of tons of coal which remain in the ground in the United States give no present economical benefit to the state, the landowner or the operator. The coal which was produced and sold when a market existed did give such benefit. Likewise, gas which remains in place after the field is generally depleted is of slight economic value and may be recoverable in theory but not in practical operation. Just as the depositor who draws upon his checking account needs payment when the check is presented, not at some future date, so the marketing program of gas must be based upon obtaining gas when needed, not at an uneconomical future date. While today natural gas markets are expanding, the future may see atomic energy or solar heat replace gas in the market.

All parties agree that the gas reserves (whether recoverable or reserves in place) underlying different tracts within the Blanco-Mesaverde Pool vary from tract to tract. The only difference among the parties is the extent or magnitude of the variances. The lowest estimate is two to one while the highest is thirty to one. A conservative median for the average variance that exists between wells in the pool is a ratio of five to one. This company's evidence supports that ratio as a pool-wide average.

The Commission's problem is to adopt a formula which, on a pool-wide basis, is designed to permit each owner, in so far as is practicable, to produce and recover his fair share of recoverable reserves. It is this company's considered opinion, based upon the drilling and operation of a majority of all existing wells in the Blanco-Mesaverde Field, and upon exhaustive and elaborate reserve studies, that there is a straight-line direct relationship between recoverable reserves and deliverability. This company recognizes that individual wells may not conform to the average but sincerely believes from all information currently available that a formula based upon deliverability is the only formula that would be fair and just for the entire pool. Various factors indicate reserves. Available evidence as to porosity and water content is fragmentary since few core analyses have been made. The use of pressure as a factor does not reflect differences in sand thicknesses and, in this field, would not initially give any consideration to substantial differences in underlying reserves. The pressures throughout the field show relatively slight differences. This company's studies indicate that there is a direct correlation between deliverability and the net effective pay of the producing sand. It would seem that deliverability is the single test reasonably reflecting the quantity of recoverable reserves which most quickly can be satisfactorily established for each well in the pool. Pending final deliverability tests, a percentage (18-20%) of the initial potential may be used as a temporary figure in lieu of tested deliverability.

It is elementary that proration must be upon a pool-wide basis rather than an individual well basis. The formula which most closely approximates for the entire pool the ratio of recoverable reserves to the average well is the formula that should be adopted. It is true that individual wells may deviate from the average. Is it not more reasonable to approach these deviations on an individual basis

after specific hearing than to attempt to pattern a pool-wide proration formula on the abnormal rather than the normal? No substantial evidence indicating uncompensated drainage of any particular well was introduced on this hearing. If any operator has suffered uncompensated drainage, it would seem only reasonable to think he would have elected to submit proof thereof. Fairness demands that the Commission should base its rules and formula upon the average of the entire pool rather than upon isolated cases involving two offset wells. When and if operations conducted under such a pool-wide formula develop inequities as between wells, then the operator suffering drainage should be permitted to apply for hearing and lower allowable may be imposed on the well causing the drainage. Such wells should be restricted by special rule rather than by general rule and only after notice and hearing.

A maximum allowable for any well has been suggested. This company believes such an approach unsound. If the Commission performs its duty and adopts that formula which most clearly reflects a direct relationship between recoverable reserves and well allowables, then each well should receive the allowable resulting from the application of that formula. To do otherwise is to concede that the formula is incorrect. To determine isolated cases by general rule rather than by special rule, after notice and hearing, would be without authority in law. A maximum allowable should be applied only on an individual well basis and afterfull opportunity to develop all facts surrounding the particular well.

The Commission properly expresses its concern about the weak well with the long payout period. El Paso Natural Gas Company has more cause to be concerned and is concerned about such wells than anyone else because this company, in its aggressive stepout program, has drilled more of these weak wells than any other operator. Regardless of which formula is adopted, many wells owned by this company will never pay out. Many wells owned by this company will never be able to make the allowable regardless of which formula may be adopted. All witnesses agree that day to day mechanics of operations and fluctuations of market demand would prevent the weakest wells from making any allowable that might be allocated to them. In so far as the 572 wells covered by the Phillips study were concerned, 30% appeared to be in this category on the basis of that study. El Paso Natural Gas Company has more weak wells than any other operator and has a sincere desire to protect its great investment in these wells. The company's recommendations protect the weak well. All witnesses admit that the effect of giving greater consideration to the acreage factor is to increase the number of limited wells. The Phillips study shows that the number of limited wells increases rapidly as the weight given to acreage increases. One objection to increasing the number of limited wells is that a deficiency will exist even between theoretical deliverability and the allowable resulting from such formula. In actual operations, this deficiency will be even greater because no well can actually make 100% of its theoretical deliverability. The effect of snowballing this deficiency is to require constant reallocation of such deficiencies to the

better wells. The result achieved by such reallocation brings the final result into nearly the same position as would have resulted had deliverability been given more weight in the first instance. It is undisputed that the existence of limited wells requires successive reallocations, creating substantially more clerical work and placing more wells in the underproduction group.

This company is deeply concerned with the prospect of under-production accumulating with the possibility of cancellation at the end of the balancing period. If under-production be cancelled rather than redistributed and reallocated on a retroactive basis to the over-producing wells, the field inevitably will fail to meet the market demand when the over-producing wells will have been shut in. If under-production at the end of the balancing period be reallocated to the over-producing wells, then unnecessary clerical work results and the final allocation comes close to that which would have been made in the first place had acreage been given less weight. This company would not be concerned about waste motion and a constant redistribution of under-production if any good purpose were achieved thereby. When the result is the same as would have been reached in the first instance by the application of a more practical formula, this company thinks the operator and the Commission both should be protected from such waste of time and money.

Whether the count be made on a well basis, acreage basis or individual operator basis, the overwhelming majority of operators favor the high deliverability formula. If the Commission has any doubt on this question, it is suggested that it take a poll. This

company has wells of all categories and sincerely believes that the fairest formula is one based upon deliverability. However, in deference to wishes of others, and as a middle-of-the road program which gives to every operator some consideration for his belief, El Paso Natural Gas Company earnestly recommends that the Commission adopt the formula based upon 75% deliverability times acreage plus 25% acreage. El Paso Natural Gas Company believes that a formula giving greater weight to the acreage factor would violate the directions of the law and would constitute a discrimination against the wells with the larger recoverable reserves. This is the considered judgment of the company from the standpoint of an operator, laying aside and disregarding any inconvenience, additional expense and operating difficulties that it may suffer as a pipe line purchaser and marketer of gas.

Respectfully submitted,

EL PASO NATURAL GAS COMPANY

By _____
Ben R. Howell, its attorney
of Jones, Hardie, Grambling & Howell
710 Bassett Tower, El Paso, Texas

EL PASO NATURAL GAS COMPANY

PROPOSED RULES AND REGULATIONS
FOR THE BLANCO MESAVERDE GAS POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS.

RULE 1. Any well drilled a distance of one mile or more from the outer boundary of the Blanco Mesaverde Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile from the outer boundary of the Blanco Mesaverde Gas Pool shall be spaced, drilled, operated and prorated in accordance with the Regulations in effect in the Blanco Mesaverde Gas Pool.

RULE 2. Each well drilled or recompleted within the Blanco Mesaverde Gas Pool shall be located on a tract consisting of not less than a half section of approximately 320 surface contiguous acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys.

RULE 3. Each well drilled within the Blanco Mesaverde Gas Pool shall be located in the northeast or southwest quarter of the section but shall not be drilled closer than 660 feet to any outer boundary line of such quarter section nor closer than 330 feet to a quarter-quarter section or subdivision inner boundary nor closer than 1320 feet to a well drilling to or capable of producing from the same pool.

RULE 4. The Secretary of the Commission shall have authority to grant exception to the requirements of Rules 2 and 3 where application has been filed in due form and such exception is required because of conditions resulting from previously drilled wells in the area or, in the case of Rule 3, the necessity of exception is based on topographic conditions.

Applicants shall furnish all operators of leases offsetting the lease containing subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all such operators, together with a written stipulation that all such operators have been properly notified. The Secretary of the Commission shall wait at least 20 days before approving any such exception and shall approve such exception only in the absence of objection of any offset operators. In the event an operator objects to the exception the Commission shall consider the matter only after proper notice and hearing.

RULE 5. The provision of Statewide Rule 104 Paragraph (k), shall not apply to the Blanco Mesaverde Gas Pool.

GAS PRORATION

RULE 6. The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Mesaverde Gas Pool and other relevant data and shall fix the

allowable production in the Blanco-Mesaverde Gas Pool, and shall allocate production among the gas wells in the Blanco-Mesaverde Gas Pool delivering to a gas transportation facility upon a reasonable basis and recognizing correlative rights, and shall include in the proration of such pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well.

PRORATION UNITS

RULE 7. A. For the purpose of gas allocation in the Blanco Mesaverde Gas Pool a standard proration unit shall consist of approximately 320 contiguous surface acres consisting of the North, South, East or West half of a section and being a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in paragraph B. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

B. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A without notice and hearing:

1. Where the unorthodox size or shape of the tract is due to a variation in legal subdivision of the U. S. Public Land Surveys; or

2. Where application has been filed in due form and where the following facts exist and the following provisions are complied with:

a. The acreage assigned the non-standard unit lies wholly within a legal section.

b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

(2) a list of names and addresses of all operators outlined in paragraph (1), together with a stipulation that proper notice has been given said operators at the addresses given and no objection is received by the Commission from such operators within 20 days after the Commission receives such application.

d. The entire non-standard proration unit may reasonably be presumed to be productive of gas.

e. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

C. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A after notice and hearing, when the operator is unable to comply with the provisions of Rule 7 B.

GAS ALLOCATION

RULE 8. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Mesaverde Gas Pool.

When a purchaser of gas, after filing its nominations for the proration period shall find that its requirements for gas have increased or decreased from the amount nominated for any month during the proration period, such purchaser shall indicate its revised estimated requirements during such month by filing supplemental nominations with the Commission at least three days prior to the regular hearing of the Commission for the month preceding such changed requirements.

All nominations shall be filed on a form prescribed by the Commission.

RULE 9. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month, together with an adjusted allowable computation for the second preceding month, said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowable assigned the top allowable units shall be reduced proportionately; and in the event the allowable assigned is less than the production, then the allowable assigned the top allowable units shall be increased proportionately.

The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool shall be divided and allocated among the wells appearing on the proration schedule in the following manner: (1) a tentative allocation shall be made by dividing seventy-five per cent (75%) of the pool allocation among said wells in the proportion that the production of each well's calculated deliverability multiplied by the acreage comprising the standard proration unit or approved non-standard unit upon which the well is located bears to the sum of such products for all the wells on the proration schedule; (2) the remaining twenty-five per cent (25%) of the pool allocation shall be divided among said wells in the proportion that the acreage comprising the proration unit of each well bears to the sum of the acreage comprising the proration unit of all wells appearing on the proration schedule. When the tentative allowable received by a well is in excess of its known producing ability, the well shall be classified as a marginal well and shall have its allowable limited to its producing ability. The sum of the difference between the tentative allowables and the limited allowables of all marginal wells on the proration schedule shall be reallocated to the non-marginal wells by application of the same formula. If such reallocation shall result in placing any other well within the marginal classification, the difference between the tentative allowable and the limited allowable of such marginal well shall be redistributed by application of the same formula until no well has received an allowable in excess of its known producing ability.

BALANCING OF PRODUCTION

RULE 10. Underproduction: The dates 7:00 A. M., March 1, and 7:00 A. M., September 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the first succeeding proration period in addition to the normal gas allowable for such succeeding period. That portion of such cumulative underproduction carried forward into the first succeeding proration period, which is not made up during said period shall be deducted from the total underproduction at the end of the period, resulting in only that volume of underproduction accrued during said period being carried forward as cumulative underproduction into the next succeeding proration period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce. All underproduction accumulated to a well classified as marginal shall be added to the allocation for non-marginal wells and distributed thereto. While classified as a marginal well, the well shall accrue neither underproduction nor overproduction and its actual production shall be restricted only by the allowable it would have been assigned if it had been a non-marginal well.

[illegible] succeeding proration period. Should the allowable so calculated be less than the accumulated overproduction at the beginning of the first succeeding proration period, the well must be shut-in until the overproduction has been reduced to such allowable. Should the well's cumulative status not be brought in balance during the first succeeding proration period, that overproduction accumulated at the end of the first succeeding proration period must be brought in balance during the second succeeding proration period or the well must be shut-in at the end of the second succeeding proration period until its cumulative status is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 12. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 13. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 14. The monthly gas production from each gas proration unit shall be metered separately and the gas production therefrom shall be reported to the Commission by the operator

so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, heaters, treaters, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

Copies of Form C-115, Monthly Production Report, submitted in compliance with Rule 14, shall be distributed by the operator as follows: Original to Oil Conservation Commission, Box 871, Santa Fe; two copies to Oil Conservation Commission, Box 697, Aztec, New Mexico.

Case 330 -
330 A

BROOKHAVEN OIL COMPANY
FIRST NATIONAL BANK BUILDING
(MAIL) P. O. BOX 544
Albuquerque, New Mexico
PHONE 7-8853 TELETYPE AQ-96

MAIN OFFICE OCC
1954 JUN 21 AM 8 : 09

June 15, 1954.

New Mexico Oil Conservation Commission
State Capitol
Santa Fe, New Mexico

Att: Mr. R. R. Spurrier, Secretary

Dear Sirs:

Enclosed herewith is Summary Statement made by the undersigned as President of Brookhaven Oil Company and Dacresa Corporation relative to Case No. 330 (Consolidated with Case 330-A). We request that this Summary Statement be included in the testimony of this case scheduled for hearing before your Commission June 21, 1954.

Very truly yours,

BROOKHAVEN OIL COMPANY
DACRESA CORPORATION

Thos. B. Scott, Jr.
President

TBS:ms

Enc. - Summary Statement

CC: Gov. Edwin L. Mechem, Chairman
Mr. E. S. Walker, Member

SUMMARY STATEMENT TO NEW MEXICO OIL AND GAS CONSERVATION COMMISSION
BY THOS. B. SCOTT, JR., PRESIDENT
OF BROOKHAVEN OIL COMPANY AND DACRESA CORPORATION
JUNE 21, 1954.

IN CASE NO. 330 (CONSOLIDATED WITH CASE 330-A) - CONCERNING GAS POOL DELINEATION AND DEFINITION, GAS PRORATION, GAS WELL SPACING, GAS PRORATION UNITS, AND RELATED MATTERS FOR THE BLANCO MESAVERDE GAS POOL.

QUALIFICIATIONS

The undersigned, Thos. B. Scott, Jr., has testified before and made statements previously to the Oil and Gas Conservation Commission. The undersigned is a graduate of Harvard College, Class of 1918, with concentration in mathematics and studies in engineering and geology. The undersigned has been in the oil and gas producing and pipeline business continuously since 1919, both in the field and in executive positions; i.e. two years with the Empire Gas & Fuel Co. in Oklahoma and Kansas, seventeen years with the Stnadard Oil Company (New Jersey) and its subsidiaries in Oklahoma, Kansas, Argentina, Bolivia, and executive offices in New York, and thereafter to the present (15 years) as head or manager of independent oil and gas producing companies and operations.

STATEMENT

1. PREMISES OF CONSERVATION AND PROHIBITION OF WASTE

   a. The law of capture prevails despite the requirements of proration and ratable take laws.

   b. Ratable take, proration, and conservation laws came into being primarily because of surplus available recoverable production, and thus the necessity to stabilize the market by curtailing production to market demand, to avoid surface waste and at the same time to protect correlative rights.

   c. Proration must be based on recoverable oil or gas and not on the theoretical content of the formation.

   d. The effective methods to prorate oil are different than the effective methods to prorate gas because of the differences between the two products.

   e. A primary requirement of ratable take or proration is that there must be uniform spacing of wells so that the drainage area will have the same cubic measure. In the event that this is impractical (which is not so in this case), production must be proportionate to the varying size of the drainage area. For instance, the New Mexico Oil and Gas Conservation Commission has ordered 320 acre spacing in this common source of supply, and if some wells are drilled and produced on 160 acre spacing, these latter wells should be produced one-half of the allowable formula for those wells drilled and produced on 320 acre spacing. In this case there should be no compensation for wells drilled on larger spacing than 320 acres.

f. Correlative rights must be protected.

2. The undersigned advocates for the Blanco Mesaverde Pool a proration order based on a formula of deliverability similar or along the lines of the Basic Proration Order for the Hugoton Gas Field, issued by the State Corporation Commission of the State of Kansas (Docket No. C-164) and to all intents and purposes, approved by the Railroad Commission of Texas and the Corporation Commission of the State of Oklahoma in the same field.

In the recent discussions had by the San Juan Basin Operators and Engineering Committee, there seems to be some concensus of opinion whereby the formula based on the following would be agreeable to the vast majority of the operators.

a. Maximum production of any well to be 25% of its open flow.

b. Minimum production of any well, if it is able to deliver, 250 MCF per day.times "acreage" (see "d" below).

c. 25% of the outlet will be allocated on an acreage basis, that is, if the total outlet is 400,000 MCF per day, 100,000 MCF per day will be divided by the number of wells producing and connected to the pipe line, each well on a 320 acre unit.

d. After deducting from the total outlet the acreage factor (c) and any surplus outlet allowed for minimum wells above the acreage factor, the balance of the outlet (75% of the total) will be based on deliverability times "acreage". Here the word "acreage" is meant as a normal factor of one, in other words, if the spacing is 320 acres, you divide the actual acreage of each well by 320 acres.

The undersigned, as a compromise, is willing to approve such a proration formula of 75% deliverability times acreage plus 25% acreage if such is advocated by the New Mexico Oil and Gas Conservation Commission and the majority of the operators.

The undersigned has computed the allocation of the actual production to different potential wells for the months of December 1953, January 1954 and February 1954 if the above compromised formula were in effect. The results of this computation seem to show the following:

a. A stipulation whereby no well could produce more than 25% of its open flow will have little effect on very few wells. Whatever effect there is will be pertinent to about as many small wells as large wells.

b. Relative to the minimum allowable of 250 MCF times acreage per well, this stipulation will probably double the actual outlet of these minimum wells, approximately three-fourths of the minimum being allocated to the acreage factor, and approximately one-fourth to the deliverability factor.

3. OWNERSHIP OIL AND GAS PROPERTIES

The undersigned have an interest in 195 producing wells in the San Juan Basin of New Mexico (San Juan and Rio Arriba Counties), of which 37 are producing from the Mesaverde formation. On the undersigned's properties are 17 drilling wells, of which 12 are drilling to the Mesaverde formation. As to lease, royalty and overriding royalty acreage, the undersigned have 5,696 net lease acres, of which 1,580 are producing, and 10,288 net royalty and overriding royalty acres, of which 2,680 are producing.

4. We submit no engineering data because we feel that many companies will submit more than enough fundamental information on which the Commission can rely.

BROOKHAVEN OIL COMPANY
DACRESA CORPORATION

Thos B Scott Jr
President

6/21/54.

MAIN GENERAL AMERICAN OIL COMPANY OF TEXAS

REPUBLIC BANK BUILDING

1954 JUN 23 AM 8:35 DALLAS, TEXAS

June 21, 1954

New Mexico Oil Conservation Commission,
Santa Fe, New Mexico.

Gentlemen:-

We are jointly interested with the El Paso Natural Gas Company in approximately 90,000 acres of leases in the San Juan Basin in New Mexico. We understand that you are considering a proration formula for gas production in this area. It occurs to us that a formula which would provide for not less that 75% weight to be given deliverability, and 25% to acreage would be fair and equitable; indeed we believe this would be the most equitable and generally advantageous formula to adopt as applied to this gas producing area. Accordingly, it is earnestly requested that you gentlemen give favorable consideration to the adoption of this formula.

Yours very truly,

Gordon Simpson

GS:s

Executive Vice-President.

AZTEC OIL & GAS COMPANY

BURT BUILDING

DALLAS 1, TEXAS

July 9, 1954

MAIN OFFICE OCC
1954 JUL 12 AM 9:26

AIR MAIL

New Mexico Oil Conservation Commission
125 Mabry Hall
State Capitol Building
Santa Fe, New Mexico

Re: Case 330-A: Gas Proration
Blanco-Mesaverde Gas Pool

Gentlemen:

Aztec Oil & Gas Company, organized in the early part of 1950 as a wholly-owned subsidiary of Southern Union Gas Company, is now a separate and independent oil and gas producing company operating in northwestern and southeastern New Mexico. As your records will indicate, Aztec is one of the major independent producers of gas in the San Juan Basin, owning or having an interest in 68 wells in the Blanco-Mesaverde Gas Pool, 132 wells completed in the Pictured Cliffs formation, 5 wells completed in the Pennsylvania formation, and one well completed in the Dakota formation. In view of its rather extensive operations and acreage holdings in the San Juan Basin, the Company is vitally interested in the institution of a proper gas proration program for the area and the related rules and allocation formulas which must be promulgated and adopted by the Commission in order to put a proration program into effect.

Mr. Van Thompson, Vice President of the Company, and I were present during the entire hearing held June 20 to June 24 inclusive, concerning Case 330-A. In view of the abundance of testimony and exhibits introduced at the hearing, we felt that any testimony or exhibits on behalf of Aztec Oil & Gas Company would be repetitious. Therefore, our participation in the case was limited to brief cross-examination of some of the witnesses. However, we would like to state our position in Case 330-A, which is briefly summarized as follows:

(1) We believe that there is a real need for proration of gas in the Blanco-Mesaverde Gas Pool because of the inequitable production and withdrawal of gas from wells in the Pool. We therefore urge the Commission to institute proration in this pool as soon as possible.

(2) We recognize that with the information and data available to the operators and the Commission, it would be impossible at this time to provide an allocation formula that would assure each and every operator in the Blanco-Mesaverde Pool an opportunity to recover his equitable share of the gas reserves in the reservoir. It is our opinion, however, that an allocation

formula of 50% acreage plus 50% deliverability times acreage is the most fair and just formula that could be adopted by the Commission at this time, and we believe that it would come the closest of all formulas submitted to enable each operator to recover his equitable share of such reserves. Moreover, we believe that this formula was fully supported by testimony and exhibits of several of the participants in the hearing, including particularly Southern Union Gas Company and the Commission's staff. In the event the Commission does not see fit to adopt the allocation formula referred to above, we recommend that serious consideration be given to the formula of 25% acreage plus 75% deliverability times acreage.

A deliverability factor alone as proposed by two of the participants in the hearing would, in our opinion, be an unfair and unjust allocation formula. It is our opinion that deliverability has very little correlation with reserves since deliverability is based primarily on permeability rather than porosity, which is one of the major factors in determining reserves.

(3) We have worked with representatives of Southern Union Gas Company on a proposed set of field rules for the Blanco-Mesaverde Gas Pool which are being submitted by the latter for your consideration. In general these rules meet with our approval; however, we would like to point out that there could, and perhaps will be, inequities if under production is cancelled in the event it is not made up within one year.

Yours very truly,

Q. B. Davis

Quilman B. Davis, General Attorney
Aztec Oil & Gas Company

QBD:dl

JASON W. KELLAHIN
ATTORNEY AT LAW
LAUGHLIN BUILDING
P. O. BOX 361
SANTA FE, N. M.

July 9, 1954

Case 330 A

MAIN OFFICE OCC

1954 JUL 10 PM 2:26

Statement of Lowry Oil Company

In Regard to O. C. C. Case No. 330 and 330 A

Lowry Oil Company holds acreage in the Blanco-Mesaverde Gas pool, and operates in Northwestern New Mexico as a producer of gas in other pools.

Lowry Oil Company would like to recommend that units of up to 640 acres be allowed in this pool for the purpose of prorating, with the right to dedicate less than 640 acres to one well, without notice or hearing, after notice to offsetting operators, where no objection is filed with the Commission.

On the basis of testimony offered in this case, Lowry Oil Company favor a formula of 75% deliverability plus 25 % acreage as being a fair and equitable means of allocating production in the Blanco-Mesaverde pool.

Respectfully submitted

Jason W. Kellahin

Lowry Oil Company
By Jason W. Kellahin
Attorney

Case 330 A

JASON W. KELLAHIN
ATTORNEY AT LAW
LAUGHLIN BUILDING
P. O. BOX 361
SANTA FE, N. M.

MAIN OFFICE OCC
1954 JUL 10 PM 2:26

July 9, 1954

Statement of Tom Bolack In Regard
To O. C. C. Case No. 330 & 330A

Tom Bolack, independent operator, holds interests in the Blanco-Mesaverde gas pool and operates generally in northwestern New Mexico.

On the basis of testimony offered at the hearing in this case, it would appear that there are some wells of high productivity apparently located on fractured zones in the producing formation. For that reason, if deliverability is to be considered as a factor in the proration formula to be adopted, we would urge the Commission to adopt a maximum allowable and suggest the figure of 2,500,000 cu. ft. per day recommended by Southern Union Gas Co., and certainly not more than 3,500,000 cu. ft. per day. It is our belief, and we feel the record shows, that some of these wells have deliverabilities having no reasonable relation to reserves. If deliverability is considered as a factor in the proration formula adopted, the maximum allowable should be limited to prevent drainage and protect correlative rights. At the same time, a minimum allowable of 100,000 cu. ft. per day should also be provided to take care of wells of marginal productivity.

On the basis of testimony offered in the case, we would favor a formula of 75% deliverability plus 25% acreage as being fair and equitable in the allocation of production in the Blanco-Mesaverde Pool.

Respectfully submitted,

TOM BOLACK

By: Jason W. Kellahin
Attorney

Case 330A

JASON W. KELLAHIN
ATTORNEY AT LAW
LAUGHLIN BUILDING
P. O. BOX 361
SANTA FE, N. M.

July 9, 1954

MAIN OFFICE OCC
1954 JUL 10 PM 2:26

Statement of W. P. Carr, Independent

Relating to O. C. C. Case No. 330 and 330-A

W. P. Carr, independent operator, is the owner of interests in the Blanco-Mesaverde Gas Pool, San Juan County, New Mexico, and has production both from the Mesaverde and Pictured Cliffs gas pools in Northwestern New Mexico.

We are convinced that the necessity for prorationing of gas exists in this area for the protection of correlative rights and for the prevention of waste, both present and future.

In order that all producers will be given an equitable opportunity to produce their fair share of the gas we feel a minimum allowable should be set, and suggest on the basis of the production figures offered at the hearing in this case, a minimum allowable of 1,250 cubic feet of gas per acre per day, with the right to commit up to one-half section of land to a well, with credit for any additional land, if larger units are allowed.

We would also suggest a maximum allowable due to the fact the evidence offered tends to show some wells in the pool have a deliverability that does not appear to be related to the reserves in place or to the recoverable reserves. As a figure for this we suggest 2,500,000 cu. ft. per day per well, unless more is required to meet pipe line demand.

As a proration formula the 75% deliverability plus 25% acreage formula appears to be satisfactory.

Respectfully submitted,

W. P. CARR

By: Jason W. Kellahin

Attorney

MAIN OFFICE OCC
1954 JUL 12 AM 9:26

DELHI OIL CORPORATION
CORRIGAN TOWER
DALLAS 1, TEXAS

P. T. BEE
EXECUTIVE VICE PRESIDENT

July 9, 1954

Oil Conservation Commission
Santa Fe, New Mexico

Re: Cases 330 and 330A, Blanco Mesaverde Gas Pool Proration, San Juan and Rio Arriba, New Mexico

Gentlemen:

Delhi Oil Corporation, owner and operator of 63 Mesaverde wells in the Blanco Mesaverde Pool located on 22,405 acres of land and owner of a substantial overriding royalty on approximately 100,000 acres of land owned and operated by El Paso Natural Gas Company, has actively participated in the various meetings of the San Juan Basin Operator's Committee Engineering Sub-committee hearings and in the recent hearing before the Oil Conservation Commission held in Santa Fe, New Mexico, commencing on June 21, 1954.

It is the opinion of Delhi Oil Corporation that the Oil Conservation Commission should adopt a proration formula that will enable each well to produce currently its allowable and to produce ultimately the amount of gas underlying the lease upon which it is located. Testimony at the recent hearing held by the Commission indicates that the factors which should be considered in arriving at a formula are as follows: Acreage, porosity, permeability, pressure, open-flow and net pay thickness.

Testimony before the Commission points up the absence of a convincing indication of drainage between wells as of this date and absence of accurate reserve data due to the non-uniformity of completion techniques and data, sand thicknesses throughout the field and porosity and permeability data in the field. Despite the fact that the Blanco Mesaverde Gas Pool has been producing for some time, it does not appear that there is sufficient production history to permit the compilation of accurate pressure decline data to determine economically recoverable reserves in the field. The deliverability of each well, however, is susceptible of definite proof and such deliverability takes into consideration and gives proper weight to pressures, open-flow, porosity and thickness of pay, all of which items along with a consideration of acreage are considered in determining recoverable reserves under a particular tract of land.

It is thus the position of Delhi Oil Corporation, based upon its knowledge and information garnered from many years of experience as an operator and producer in the Blanco Mesaverde Gas Pool, that the most fair and equitable proration formula is one which allocates to all non-marginal wells an allowable in the proportion that the product of each individual well's calculated deliverability and acreage bears to the sum of such products for all non-marginal wells. It is Delhi Oil Corporation's position that a well

which is not able to produce its allowable should be classified as a marginal well and given an allowable equal to its ability to produce; the allowable thus given to all marginal wells should be subtracted from the total pool allocation prior to allocation among the non-marginal wells.

Attached hereto is a copy of the proposed rules and regulations for the Blanco Mesaverde Gas Pool submitted by Delhi Oil Corporation for your perusal and consideration.

Yours very truly

P. T. Brown

PTB:ab

DELHI OIL CORPORATION

PROPOSED RULES AND REGULATIONS
FOR THE BLANCO MESAVERDE GAS POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS.

RULE 1. Any well drilled a distance of one mile or more from the outer boundary of the Blanco Mesaverde Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile from the outer boundary of the Blanco Mesaverde Gas Pool shall be spaced, drilled, operated and prorated in accordance with the Regulations in effect in the Blanco Mesaverde Gas Pool.

RULE 2. Each well drilled or recompleted within the Blanco Mesaverde Gas Pool shall be located on a tract consisting of not less than a half section of approximately 320 surface contiguous acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys.

RULE 3. Each well drilled within the Blanco Mesaverde Gas Pool shall be located in the northeast or southwest quarter of the section but shall not be drilled closer than 660 feet to any outer boundary line of such quarter section nor closer than 330 feet to a quarter-quarter section or subdivision inner boundary nor closer than 1320 feet to a well drilling to or capable of producing from the same pool.

RULE 4. The Secretary of the Commission shall have authority to grant exception to the requirements of Rules 2 and 3 where application has been filed in due form and such exception is required because of conditions resulting from previously drilled wells in the area or, in the case of Rule 3, the necessity of exception is based on topographic conditions.

Applicants shall furnish all operators of leases offsetting the lease containing subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all such operators, together with a written stipulation that all such operators have been properly notified. The Secretary of the Commission shall wait at least 20 days before approving any such exception and shall approve such exception only in the absence of objection of any offset operators. In the event an operator objects to the exception the Commission shall consider the matter only after proper notice and hearing.

RULE 5. The provision of Statewide Rule 104 Paragraph (k), shall not apply to the Blanco Mesaverde Gas Pool.

RULE 6. The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Mesaverde Gas Pool and other relevant data and shall fix the allowable production of the Blanco Mesaverde Gas Pool, and shall allocate production among the gas wells in the Blanco Mesaverde Gas Pool upon a reasonable basis with due regard to correlative rights.

RULE 7. A. For the purpose of gas allocation in the Blanco Mesaverde Gas Pool a standard proration unit shall consist of approximately 320 contiguous surface acres consisting of the North, South, East or West half of a section and being a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in paragraph B. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

B. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A without notice and hearing:

1. Where the unorthodix size or shape of the tract is due to a variation in legal subdivision of the U. S. Public Land Surveys; or

2. Where application has been filed in due form and where the following facts exist and the following provisions are complied with:

a. The acreage assigned the non-standard unit lies wholly within a legal section.

b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

(2) a list of names and addresses of all operators outlined in paragraph (1), together with a stipulation that proper notice has been given said operators at the addresses given and no objection is received by the Commission from such operators within 20 days after the Commission receives such application.

d. The entire non-standard proration unit may reasonably be presumed to be productive of gas.

e. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

C. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A after notice and hearing, when the operator is unable to comply with the provisions of Rule 7 B.

GAS ALLOCATION

RULE 8. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration, by months, from the Blanco Mesaverde Gas Pool.

When a purchaser of gas, after filing its nominations for the proration period shall find that its requirements for gas have increased or decreased from the amount nominated for any month during the proration period, such purchaser shall indicate its revised estimated requirements during such month by filing supplemental nominations with the Commission at least three days prior to the regular hearing of the Commission for the month preceding such changed requirements.

All nominations shall be filed on a form prescribed by the Commission.

RULE 9. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month, together with an adjusted allowable computation for the second preceding month, said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowable assigned the non-marginal units shall be reduced proportionately; and in the event the allowable assigned is less than the production, then the allowable assigned the non-marginal units shall be increased proportionately.

The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool remaining after subtracting the capacities of marginal units shall be divided and allocated among the non-marginal units in the proportion that the product of each individual well's calculated deliverability and acreage bears to the sum of such products for all the non-marginal wells. The calculated deliverability mentioned above shall be that deliverability as determined by a test taken in accordance with the provisions of Order No. R-333 or Order No. R-333A of the Mexico Oil Conservation Commission.

BALANCING OF PRODUCTION

RULE 10. Underproduction: The dates 7:00 A.M., March 1, and 7:00 A.M. September 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the first succeeding proration period in addition to the normal gas allowable for such succeeding period. That portion of such cumulative underproduction carried forward into the first succeeding proration period, which

is not made up during said period shall be deducted from the total underproduction at the end of the period, resulting in only that volume of underproduction accrued during said period being carried forward as cumulative underproduction into the next succeeding proration period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

RULE 11. Overproduction: An operator will be allowed to overproduce a well during a proration period and to accumulate and carry over such overproduction into the first succeeding proration period in an amount not in excess of the total allowable assignable to the well based on nominations for the first succeeding proration period. Should the allowable so calculated be less than the accumulated overproduction at the beginning of the first succeeding proration period, the well must be shut-in until the overproduction has been reduced to such allowable. Should the well's cumulative status not be brought in balance during the first succeeding proration period, that overproduction accumulated at the end of the first succeeding proration period must be brought in balance during the second succeeding proration period or the well must be shut-in at the end of the second succeeding proration period until its cumulative status is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 12. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 13. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 14. The monthly gas production from each gas proration unit shall be metered separately and the gas production therefrom shall be reported to the Commission by the operator so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, heaters, treaters, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

Copies of Form C-115, Monthly Production Report, submitted in compliance with Rule 14, shall be distributed by the operator as follows: Original to Oil Conservation Commission, Box 871, Santa Fe; two copies to Oil Conservation Commission, Box 697, Aztec, New Mexico.

Case 330 - 330-A

HUMBLE OIL & REFINING COMPANY

MIDLAND, TEXAS

MAIN OFFICE OCC

1954 JUL 13 PM 1 09

J. W. HOUSE

July 6, 1954

File: 6-1 New Mexico

New Mexico Oil Conservation Commission
Box 871
Santa Fe, New Mexico

Attention of Mr. William B. Macey

Gentlemen:

The Humble Oil & Refining Company requests that the following statement be made a part of the record in Case 330 and 330-A, concerning an Order promulgating rules and regulations for the Blanco-Mesa Verde Gas Pool. The above cases were called for hearing June 21, 1954.

"While the Humble Oil & Refining Company has no direct interest in the Blanco-Mesa Verde Gas Pool, it has substantial lease interests in the San Juan area which will be directly affected by any precedent establishing gas proration within that area. The Humble Oil & Refining Company has consistently advocated and supported the proration of oil on an acreage basis in New Mexico. From the producers standpoint, the basic principals of the proration of oil and the proration of gas are the same. The Humble Oil & Refining Company recommends that the Blanco-Mesa Verde Gas Pool be prorated on an acreage basis. In the event that the Commission determines that either deliverability or bottom hole pressure shall be used in a proration formula, it is our recommendation that pressure is perferable to deliverability and that use of pressure be limited to the following weight: 75 percent acreage plus 25 percent acreage times bottom hole pressure."

Yours very truly,

HUMBLE OIL & REFINING COMPANY

J. W. HOUSE

R S Dewey

BY: R. S. DEWEY

RSD/rs

Rule 4: The monthly allocation to the Bon Pool shall be divided & allocated among the wells connected to a gas T. F. in the following manner:

~~Seventy-five~~ Eighty Percent (75%) of the monthly allocation ~~shall be divided among the wells in the proportion that the~~ of the production of each well bears ~~to the beginning of~~

~~and the~~

Insert at "A" The minimum well allowable established shall be effective during the entire ~~succeeding~~ proration period and shall be changed only in an emergency or on the event of unusual marketing conditions.

~~Rule 4~~ All wells whose calculated deliverability (as defined herein) is less than the daily minimum well allowable established for the proration period shall be classed as marginal wells and their allowable limited to their actual production ~~ability~~. The sum of the allocation to all the marginal wells shall be known as the "Marginal well allocation."

The marginal well allocation shall be subtracted from the total pool allocation for that month in order to obtain the total non-marginal ~~wells~~ allocation.

~~Seventy-Five Percent~~ non-marginal allocation shall be distributed

among the non-marginal wells in the proportion that the product of each wells calculated deliverability times its acreage factor bears to the sum of ~~the calculated~~

The product obtained by multiplying each wells acreage factor by the calculated deliverability (expressed as M.C.F.P.D.) for that well shall be known as the "AD factor for that well. The acreage factor shall be determined by dividing the acreage ~~to the nearest fraction of a unit~~ within the proration unit by 320. The "AD factor" shall be computed to the nearest whole unit.

(A.) Seventy Five Percent of the ~~total monthly~~ allocation to the non marginal well allocation shall be distributed among the wells in the proportion that each wells "AD Factor" bears to the sum of ~~the~~ the non marginal "AD" factors for the pool.

(B) Twenty Five percent of the non marginal well allocation shall be distributed among the wells in the proportion that each wells acreage factor bears to the ~~total~~ sum of all the non marginal acreage factors in the pool.

The ~~daily~~ monthly allowable assigned each well shall be the sum of the 2 allowables determined under A & B above provided however that no well shall be assigned an allowable less than the maximum well allowable as established for that

(D)

provision period.

~~Deliverability pressure~~ The Calculated deliverability at the pressure used herein shall be determined in accordance with the provisions of Order R-333A: Provided however that the deliverability pressure shall be equal to 50% of the wells

Rule 5 The calculated deliverability at the "deliverability Pressure" shall be determined in accordance with the provisions of Order R-333A: Provided however that the deliverability Pressure shall be determined as follows:

/ Deliverability pressure, as used herein for Mesaverde production, is an arbitrary pressure applied to each well and used in the process of comparing the abilities of wells in this formation to produce against a back pressure equal to fifty (50) per cent, of the seven (7) day shut-in pressure of the respective individual wells, ~~but in no case to exceed a maximum of 500 psia.~~

Rule 6: In order to assign allowables deliverability tests taken during the year 1954 shall be used

Rule 6

Rule 7

Rule 8

Rule 9: No well shall be assigned an allowable unless either a deliverability test, taken in conformance with the provisions of Order R-333A, ~~but~~ and Initial or a Potential test taken in conformance with the provisions of Order R-333A has been submitted. In the event a deliverability test has not been submitted

In assigning allowables to newly completed wells in the absence of ~~a~~ deliverability test data the open flow potential test taken in conformance with order R-333A may be used in appropriately the wells deliverability. In this instance an assumed deliverability equal to ~~3~~ 30% of the volume of gas produced on the initial potential test will be used. The allowables thus established using an assumed deliverability shall be tentative allowables and upon submission of an deliverability test the allowables previously assigned the well shall be recalculated using the deliverability test data.

Deliverability tests shall be taken and calculated in conformance with Order R-333A, ~~and~~ the provisions of Rule 5 of this order and the testing schedule ~~as established~~ provisions of Order R-333A.

Deliverability tests taken during 1954 shall be used in calculating allowables for the proration period commencing March 1 1954 and August 1 1954. Subsequent annual tests shall be used in calculating allowables for proration periods commencing during the next ensuing year.

Mr R.R Spurrier
Oil Conservation Commission
Santa Fe New Mexico

STATEMENT ON BEHALF
OF
SKELLY OIL COMPANY
BLANCO MESAVERDE FIELD,
SAN JUAN, RIO ARRIBA COUNTIES, NEW MEXICO

MAIN OFFICE OCC
1954 JUL 6 AM 8:23

Skelly Oil Company at the beginning of the hearing made its position clear. It stated that it felt the Oil Conservation Commission should continue its time honored practice of prorating oil and gas, or both, on the basis of unit allowables; however, if the Commission desired to deviate from such a historical and satisfactory practice, then it favored an allocation formula of Acreage times Pressure, which apparently had not been considered and analyzed by any other interested party. This formula, which Skelly has proposed, has been in operation in various pools a number of years, and in conjunction with an over and under provision has accomplished these three things:

1. Prevents or minimizes drainage between tracts.

2. Allocation between tracts on a fair and reasonable basis in relation to the respective reserves.

3. Assures the fulfillment of a market demand.

The formula, as proposed by Skelly Oil Company, is the only formula that accomplishes all three objectives, the first two objectives being statutory; that is, drainage Sec. 12-c, and fair and reasonable proration on reserve basis Sec. 13-a, and the latter being one within the realm of discretion on the part of the Oil Conservation Commission Sec. 12-d.

It is well to point out that of all the formulas presented the Acreage times Pressure had less criticism, and whatever objections were made were to a greater degree objections to deliverability itself. The use of pressure is a superior, well recognized method of computing reserves. The record undoubtedly shows that the vast majority of technicians have stated to the Commission that deliverability has no relationship to reserves - this was so stated even by those recommending some factor of deliverability.

It is our concluding thought that for a permanent, fair and reasonable allocation formula which will prevent or minimize drainage with a relationship to reserves, the formula of Acreage times Pressure is the best formula deviating from the present historical policy of unit allocation.

Attached hereto are our proposed rules which have heretofore been made part of the record. One comment may be made as to the balancing dates being February 1,-August 1, instead of March 1,-September 1. We offer no objections to this.

Respectfully submitted,

SKELLY OIL COMPANY

George W. Selinger

GWS:dd

cc: Southern Union Gas Company
Attn: Mr. A. S. Grenier
Dallas, Texas

Stanolind Oil & Gas Company
Attn: Mr. J. K. Smith
Fort Worth, Texas

Phillips Petroleum Company
Attn: Mr. E. H. Foster
Amarillo, Texas

Pubco, Inc.
Attn: Mr. J. Glenn Turner
Mercantile Bank Building
Dallas, Texas

El Paso Natural Gas Company
Attn: Mr. Ben Howell
Bassett Tower
El Paso, Texas

PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

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PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

No. 15204 WIRE BOUND
No. 5204 PADDED

Blanco - Mesaverde
1954

		(1) Prod. Mcf	(2) Mcf. Daily average	(3) No. of Days	(4)
1	Jan.	8477391	273529	31	
2	Feb	8318777	297099 ✓	28	
3	March	9048721	291894	31	
4	April	7783545	259451	30	
5	May	8036687	259248 ✓	31	
6	June	7800897	260030	30	
7	July	8668728	279636	31	
8	Aug	8453863	272705	31	
9					
10	Total for period →	66590609	274035	243	
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Case 330
3-30-11

LUCERNE CORPORATION
MERCANTILE SECURITIES BUILDING
DALLAS 1, TEXAS

MAIN OFFICE OCC
1954 JUN 18 AM 8:21

June 16, 1954

New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Attention: Mr. R. R. Spurrier, Director

Dear Mr. Spurrier:

We understand that a hearing will be held Monday, June 21 to consider gas proration methods for gas produced from the Mesa Verde formation in the San Juan Basin, New Mexico.

Lucerne Corporation, et al, are co-owners with El Paso Natural Gas Company of a 2480-acre Federal lease located in Sections 3, 4, 9, 10, 11, and 12, Township 31 North, Range 10 West, San Juan County, New Mexico. This is our Roberson lease, and that part of the lease in Sections 11 and 12 are committed to the 32-9 Unit, and one gas well producing from the Mesa Verde formation was completed in the E½ of Section 12. The remainder of the lease is located in Sections 3, 4, 9 and 10, and contains approximately 1280 acres. The SE¼ of Section 4 is part of the 320 acre drilling unit on which a producing well has been completed in the SW¼ of Section 4. The SW¼ of Section 9 is part of a 320 acre unit on which a well is now drilling. In addition to the 320 acre unit, the E½ of Section 9 has a location in the NE¼ of Section 9.

Because of our holdings with El Paso, we are interested in the proration plans for this area and hope that a plan will be adopted which will be fair to the producers and one under which the gas purchasers can operate without difficulty.

We feel that acreage should be recognized and suggest that 25% of the field outlet should be divided over the 320 acre producing units entirely on an acreage basis. We do not favor allocation of more than 320 acres to a producing unit except an additional amount of acreage to take care of irregularities in surveys, maximum excess acreage 10%. We suggest that 75% of the field outlet should be divided between the producing wells on the deliverability factor.

The combination of 25% on acreage and 75% on deliverability should satisfy the operators with small wells and also the operators who have a fortunate structural position with good development of the producing section.

We are sending a copy of this letter to the El Paso Natural Gas Company, and we are willing for their representative to represent us also at the hearing June 21.

Yours very truly,

LUCERNE CORPORATION

F. M. Jacobson, President

FMJ..jur

cc: Mr. Foster Morrill
Roswell, New Mexico

El Paso Natural Gas Company
El Paso, Texas
Attn: Mr. Ben Howell

Case 330
330-A

MAIN OFFICE OCC
1954 JUN 10 AM 8:22

BEAVER LODGE OIL CORPORATION

CRITCHELL PARSONS
PRESIDENT

301 MERCANTILE COMMERCE BUILDING
RIVERSIDE-9081
DALLAS 1, TEXAS

June 16, 1954

New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: R. R. Spurrier, Secretary

Gentlemen:

Re: Proration of Gas in the
San Juan Basin, New Mexico

It is our understanding that a hearing is to be held before the New Mexico Oil Conservation Commission on Monday, June 21, 1954, regarding the proration of gas in the San Juan Basin. The purpose of this letter is to state our position in the determination of individual well allowables for this area.

Our Company is the owner of fractional interests in approximately eighty (80) producing Mesaverde gas wells. Our interests are fairly well distributed in areas that are considered to be from below average to above average in well potentials and reserves.

It is our considered opinion that the deliverability of an individual well is a true reflection of the reserves that underly the surrounding acreage. For this reason we believe that a fair determination of allowables should be based solely upon the deliverability of the well. We believe any formula which would include less than a 75% deliverability factor would be unjust to the operators that have carefully selected their acreage. It has been our own experience that the more favorably located acreage requires substantially more capital investment than acreage located on the flanks of the field.

A very substantial part of the Company's assets are located in the San Juan Basin. We sincerely hope that you will give careful consideration to the factors outlined above.

Very truly yours,

BEAVER LODGE OIL CORPORATION

Critchell Parsons

CP:PS
CC: Mr. Ben Howell
Jones, Hardie, Grambling & Howell
7th Floor Bassett Tower
El Paso, Texas

MAIN OFFICE OCC

1954 JUN 21 AM 9:02

Dallas, Texas
June 18, 1954

Oil Conservation Commission of
the State of New Mexico
State Capitol Building
Santa Fe, New Mexico

Gentlemen:

It is my understanding that, at nine o'clock A. M. on Monday morning, June 21, 1954, the Oil Conservation Commission of the State of New Mexico will hold a hearing on the proposed proration of Mesaverde Formation gas in the Blanco Field of San Juan and Rio Arriba Counties, New Mexico. It is, likewise, my understanding that the Engineering Committee for the San Juan Basin Operators' Association has made a detailed study of the most equitable proration formula which they may recommend to the Honorable Commission, and that such Committee proposes to recommend to the Commission the adoption of a proration formula based upon a seventy-five percent deliverability factor and a twenty-five percent acreage factor.

At the present time I have either working interests or overriding royalty interests in several thousand acres of oil and gas leases situated in the San Juan Basin, and I believe there are presently producing from such leases at least one hundred Mesaverde Formation gas wells. Based upon these interests, I wish to urgently request the Honorable Commission to favorably consider the above mentioned recommendation of the Engineering Committee for the San Juan Basin Operators' Association. It is my belief that such a formula as this Committee proposes is one which adequately protects all operators but does not penalize any. It is my further belief that any dimunition of the deliverability factor in any proration formula can only result in a tremendous confiscation of

the rights and interests of a majority of the operators in this area.

In the event I may furnish to the Commission any further information or data based upon my experience as an operator of several years' standing in this area I will, of course, be only too happy to do so.

With best wishes, I am

Sincerely yours,

Mike Abraham

Mike Abraham

MAIN OFFICE OCC

1954 JUN 22 AM. 8:55

Farmington, New Mexico
June 18, 1954

Oil Conservation Commission of
the State of New Mexico
State Capitol Building
Santa Fe, New Mexico

Gentlemen:

It is my understanding that, at nine o'clock A. M. on Monday, June 21, 1954, the Oil Conservation Commission of the State of New Mexico will hold a hearing on the proposed proration of Mesaverde Formation gas in the Blanco Field of San Juan and Rio Arriba Counties, New Mexico. It is, likewise, my understanding that the Engineering Committee for the San Juan Basin Operators' Association has made a detailed study of the most equitable proration formula which they may recommend to the Honorable Commission, and that such Committee proposes to recommend to the Commission the adoption of a proration formula based upon a seventy-five percent deliverability factor and a twenty-five percent acreage factor.

At the present time I have either working interests or overriding royalty interests in several thousand acres of oil and gas leases situated in the San Juan Basin, and I believe there are presently producing from such leases at least twenty-five Mesaverde Formation gas wells. Based upon these interests, I wish to urgently request the Honorable Commission to favorably consider the above mentioned recommendation of the Engineering Committee for the San Juan Basin Operators' Association. It is my belief that such a formula as this Committee proposes is one which adequately protects all operators but does not penalize any. It is my further belief that any dimunition of the deliverability factor in any proration formula can only result in a tremendous confiscation of the rights and interests of a majority of the operators in this area.

In the event I may furnish to the Commission any further information or data based upon my experience as an operator of several years' standing in this area I will, of course, be only too happy to do so.

With best wishes, I am

W. O. McConnell

W. O. McConnell

GOVERNORS OFFICE JUN 21 54
SANTA FE, N. M.

INTER-OFFICE TRANSMITTAL SLIP

TO R. R. Spurrier

FROM Edwin L Mechem

( ) For Approval

( ) For Signature

(✓) Note and Advise

( ) Note and Return

( ) For Your Files

( ) For Your Handling

Remarks:

BROOKHAVEN OIL COMPANY
FIRST NATIONAL BANK BUILDING
(MAIL) P. O. BOX 644
Albuquerque, New Mexico
PHONE 7-8853 TELETYPE AQ-96

June 15, 1954.

RECEIVED
OFFICE OF THE GOVERNOR
SANTA FE, N. M.
JUN 18 9 08 AM '54

New Mexico Oil Conservation Commission
State Capitol
Santa Fe, New Mexico

Att: Mr. R. R. Spurrier, Secretary

Dear Sirs:

Enclosed herewith is Summary Statement made by the undersigned as President of Brookhaven Oil Company and Dacresa Corporation relative to Case No. 330 (Consolidated with Case 330-A). We request that this Summary Statement be included in the testimony of this case scheduled for hearing before your Commission June 21, 1954.

Very truly yours,

BROOKHAVEN OIL COMPANY
DACRESA CORPORATION

Thos. B. Scott, Jr.
President

TBS:ms

Enc. - Summary Statement

CC: Gov. Edwin L. Mechem, Chairman
Mr. E. S. Walker, Member

SUMMARY STATEMENT TO NEW MEXICO OIL AND GAS CONSERVATION COMMISSION
BY THOS. B. SCOTT, JR., PRESIDENT
OF BROOKHAVEN OIL COMPANY AND DACRESA CORPORATION
JUNE 21, 1954.

IN CASE NO. 330 (CONSOLIDATED WITH CASE 330-A) - CONCERNING GAS POOL DELINEATION AND DEFINITION, GAS PRORATION, GAS WELL SPACING, GAS PRORATION UNITS, AND RELATED MATTERS FOR THE BLANCO MESAVERDE GAS POOL.

QUALIFICIATIONS

The undersigned, Thos. B. Scott, Jr., has testified before and made statements previously to the Oil and Gas Conservation Commission. The undersigned is a graduate of Harvard College, Class of 1918, with concentration in mathematics and studies in engineering and geology. The undersigned has been in the oil and gas producing and pipeline business continuously since 1919, both in the field and in executive positions; i.e. two years with the Empire Gas & Fuel Co. in Oklahoma and Kansas, seventeen years with the Standard Oil Company (New Jersey) and its subsidiaries in Oklahoma, Kansas, Argentina, Bolivia, and executive offices in New York, and thereafter to the present (15 years) as head or manager of independent oil and gas producing companies and operations.

STATEMENT

1. PREMISES OF CONSERVATION AND PROHIBITION OF WASTE

   a. The law of capture prevails despite the requirements of proration and ratable take laws.

   b. Ratable take, proration, and conservation laws came into being primarily because of surplus available recoverable production, and thus the necessity to stabilize the market by curtailing production to market demand, to avoid surface waste and at the same time to protect correlative rights.

   c. Proration must be based on recoverable oil or gas and not on the theoretical content of the formation.

   d. The effective methods to prorate oil are different than the effective methods to prorate gas because of the differences between the two products.

   e. A primary requirement of ratable take or proration is that there must be uniform spacing of wells so that the drainage area will have the same cubic measure. In the event that this is impractical (which is not so in this case), production must be proportionate to the varying size of the drainage area. For instance, the New Mexico Oil and Gas Conservation Commission has ordered 320 acre spacing in this common source of supply, and if some wells are drilled and produced on 160 acre spacing, these latter wells should be produced one-half of the allowable formula for those wells drilled and produced on 320 acre spacing. In this case there should be no compensation for wells drilled on larger spacing than 320 acres.

f. Correlative rights must be protected.

2. The undersigned advocates for the Blanco Mesaverde Pool a proration order based on a formula of deliverability similar or along the lines of the Basic Proration Order for the Hugoton Gas Field, issued by the State Corporation Commission of the State of Kansas (Docket No. C-164) and to all intents and purposes, approved by the Railroad Commission of Texas and the Corporation Commission of the State of Oklahoma in the same field.

In the recent discussions had by the San Juan Basin Operators and Engineering Committee, there seems to be some consensus of opinion whereby the formula based on the following would be agreeable to the vast majority of the operators.

a. Maximum production of any well to be 25% of its open flow.

b. Minimum production of any well, if it is able to deliver, 250 MCF per day times "acreage" (see "d" below).

c. 25% of the outlet will be allocated on an acreage basis, that is, if the total outlet is 400,000 MCF per day, 100,000 MCF per day will be divided by the number of wells producing and connected to the pipe line, each well on a 320 acre unit.

d. After deducting from the total outlet the acreage factor (c) and any surplus outlet allowed for minimum wells above the acreage factor, the balance of the outlet (75% of the total) will be based on deliverability times "acreage". Here the word "acreage" is meant as a normal factor of one, in other words, if the spacing is 320 acres, you divide the actual acreage of each well by 320 acres.

The undersigned, as a compromise, is willing to approve such a proration formula of 75% deliverability times acreage plus 25% acreage if such is advocated by the New Mexico Oil and Gas Conservation Commission and the majority of the operators.

The undersigned has computed the allocation of the actual production to different potential wells for the months of December 1953, January 1954 and February 1954 if the above compromised formula were in effect. The results of this computation seem to show the following:

a. A stipulation whereby no well could produce more than 25% of its open flow will have little effect on very few wells. Whatever effect there is will be pertinent to about as many small wells as large wells.

b. Relative to the minimum allowable of 250 MCF times acreage per well, this stipulation will probably double the actual outlet of these minimum wells, approximately three-fourths of the minimum being allocated to the acreage factor, and approximately one-fourth to the deliverability factor.

3. OWNERSHIP OIL AND GAS PROPERTIES

The undersigned have an interest in 195 producing wells in the San Juan Basin of New Mexico (San Juan and Rio Arriba Counties), of which 37 are producing from the Mesaverde formation. On the undersigned's properties are 17 drilling wells, of which 12 are drilling to the Mesaverde formation. As to lease, royalty and overriding royalty acreage, the undersigned have 5,696 net lease acres, of which 1,580 are producing, and 10,288 net royalty and overriding royalty acres, of which 2,680 are producing.

4. We submit no engineering data because we feel that many companies will submit more than enough fundamental information on which the Commission can rely.

BROOKHAVEN OIL COMPANY
DAGRESA CORPORATION

Thomas B. Scott
President

6/21/54.

Case 330

THE ATLANTIC REFINING COMPANY

PETROLEUM PRODUCTS

McCLINTIC BUILDING

MIDLAND, TEXAS

MAIN OFFICE OCC
1954 JUL 6 AM 8:32

July 1, 1954

MAILING ADDRESS
P. O. BOX 871
MIDLAND, TEXAS

Oil Conservation Commission
State of New Mexico
Santa Fe, New Mexico

ATTENTION: Mr. R. R. Spurrier

Gentlemen:

With reference to the special hearing held in Santa Fe during the period June 21 - 24, 1954 concerning Cases 330 and 330-A and involving the promulgation of rules and regulations for the Blanco-Mesaverde Gas Pool, The Atlantic Refining Company requests that the following statement be made a part of the record in these two consolidated cases:

> "The Atlantic Refining Company does not operate any wells in the Blanco-Mesaverde Gas Pool but does have a considerable interest in approximately 12,000 acres and thirty-three (33) wells located within the defined limits of this pool. From private study and also from weighing the testimony and evidence introduced at the hearing held on June 21 - 24 for the purpose of considering proration for the pool, Atlantic has reached the conclusion that deliverability cannot be correlated with and does not represent the magnitude of recoverable reserves underlying each drilling unit. It is the position of The Atlantic Refining Company that a proration formula of 100% acreage multiplied by rock pressure will afford the most equitable and practicable method of gas prorationing in the Blanco-Mesaverde Pool; therefore, we are in accord with the recommendation of the Skelly Oil Company in regard to use of this formula by the Oil Conservation Commission."

Yours very truly,

THE ATLANTIC REFINING COMPANY

R. E. Howard

R. E. Howard
Regional Petroleum Engineer

JHV/dm

Hon. E. L. Mechem Governor
Oil Conservation Commission
Santa Fe, New Mexico

Case 2-27

MAIN OFFICE OCC
1954 JUL 6 AM 9:33

STATEMENT ON BEHALF
OF
SKELLY OIL COMPANY
BLANCO MESAVERDE FIELD,
SAN JUAN, RIO ARRIBA COUNTIES, NEW MEXICO

Skelly Oil Company at the beginning of the hearing made its position clear. It stated that it felt the Oil Conservation Commission should continue its time honored practice of prorating oil and gas, or both, on the basis of unit allowables; however, if the Commission desired to deviate from such a historical and satisfactory practice, then it favored an allocation formula of Acreage times Pressure, which apparently had not been considered and analyzed by any other interested party. This formula, which Skelly has proposed, has been in operation in various pools a number of years, and in conjunction with an over and under provision has accomplished these three things:

1. Prevents or minimizes drainage between tracts.

2. Allocation between tracts on a fair and reasonable basis in relation to the respective reserves.

3. Assures the fulfillment of a market demand.

The formula, as proposed by Skelly Oil Company, is the only formula that accomplishes all three objectives, the first two objectives being statutory; that is, drainage Sec. 12-c, and fair and reasonable proration on reserve basis Sec. 13-a, and the latter being one within the realm of discretion on the part of the Oil Conservation Commission Sec. 12-d.

It is well to point out that of all the formulas presented the Acreage times Pressure had less criticism, and whatever objections were made were to a greater degree objections to deliverability itself. The use of pressure is a superior, well recognized method of computing reserves. The record undoubtedly shows that the vast majority of technicians have stated to the Commission that deliverability has no relationship to reserves - this was so stated even by those recommending some factor of deliverability.

It is our concluding thought that for a permanent, fair and reasonable allocation formula which will prevent or minimize drainage with a relationship to reserves, the formula of Acreage times Pressure is the best formula deviating from the present historical policy of unit allocation.

Attached heretc are our proposed rules which have heretofore been made part of the record. One comment may be made as to the balancing dates being February 1,-August 1, instead of March 1,-September 1. We offer no objections to this.

Respectfully submitted,

SKELLY OIL COMPANY

George W. Selinger

George W. Selinger

GWS:dd

cc: Southern Union Gas Company
Attn: Mr. A. S. Grenier
Dallas, Texas

Stanolind Oil & Gas Company
Attn: Mr. J. K. Smith
Fort Worth, Texas

Phillips Petroleum Company
Attn: Mr. E. H. Foster
Amarillo, Texas

Pubco, Inc.
Attn: Mr. J. Glenn Turner
Mercantile Bank Building
Dallas, Texas

El Paso Natural Gas Company
Attn: Mr. Ben Howell
Bassett Tower
El Paso, Texas

PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of prersure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

Case 330
330-A

FORM 1080 1-51

STANOLIND OIL AND GAS COMPANY

OIL AND GAS BUILDING

FORT WORTH, TEXAS

JAMES K. SMITH
DIVISION ATTORNEY

July 6, 1954

Statement of Stanolind Oil and Gas Company
In re: Gas Proration - Blanco-Mesa Verde
Pool - Case Nos. 330 and 330-A.

Oil Conservation Commission
of the State of New Mexico
Santa Fe, New Mexico

Attention: Mr. R. R. Spurrier, Secretary

Gentlemen:

In accordance with the suggestion of the Commission, we are submitting herein a written statement with reference to the proration of gas and the allocation factors to be used in the Blanco-Mesa Verde Pool.

It appears that all parties interested in the proceedings assume the necessity for gas proration in the Blanco-Mesa Verde Pool, and the evidence in the record supports such position. The difficulty appears to lie altogether in the proper manner of allocating the gas to be prorated.

For consideration at this time by the Commission is the propriety of the size of the proration unit for the Blanco-Mesa Verde Pool. In Case No. 317, Order R-110, promulgated November 9, 1951, the Commission established the size of the proration unit for the Blanco-Mesa Verde Pool as consisting of 320 acres, or a legal United States General Land Office survey half-section following the usual legal subdivision of such Land Office survey and permitting also exceptions for contiguous tracts of approximately 320 acres following regular Land Office subdivision. Testimony at the Hearing just concluded supported the efficient and economic drainage area of 320 acres, and the suggestion was made that tolerance be permitted without penalty or bonus in those instances

where the number of acres included within the proration unit does not exceed 325 acres and is not less than 315 acres. No contest of this suggestion appears to have been made at the Hearing.

Another factor to be considered by the Commission is the establishment of balancing periods and the establishment also of the respective dates for each balancing period. So far as Stanolind Oil and Gas Company is concerned, this matter appears to be primarily of interest to the purchasing companies, and we have no comment to make with reference thereto. However, your attention is directed to Section 12 (c) of the Act of 1949, Chapter 168, relating to the conservation of oil and gas, which provides that the Commission shall fix proration periods of not less than six months.

As stated heretofore, the primary controversy appears to be centered around the proper allocation formula to be used by the Commission. The recommendations made by several of the companies appear to vary from allocation based entirely upon acreage, to allocation based upon acreage times deliverability. Some evidence was submitted recommending both minimum and maximum allowables. The latter recommendation appears to be inconsistent with the positions taken by the companies supporting an allocation formula which includes a deliverability factor. The varying positions taken by certain of the companies may be briefly stated as follows:

Skelly Oil Company took the position that the allocation should be based entirely upon acreage; injecting, however, the recommendation that bottom hole pressures be used as the factor in permitting variance of allowables between wells. Skelly's approach is essentially negative, in that attempt was made to establish that disparity of reserves in the field could not possibly be as high as the range in deliverabilities, and that allowance of a variable factor based upon bottom hole pressures would permit some variation but would not be as high as the variance indicated by use of deliverability

as the sole variable factor. According to their testimony, allocation on the basis of bottom hole pressures would permit a variance on the order of 1.84 to 1. Other testimony in the record indicates that such a formula does not do justice to known disparity in reserves between the respective proration units.

At this point, the Commission's attention is directed to Section 13 (a) of the Act of 1949, Chapter 168, as amended, which requires that proration be established on a basis of recoverable reserves. It is obvious that a proration unit which has no well upon it should not be assigned an allowable. It is equally obvious that ability to deliver gas is a factor which the Legislature had in mind in making a determination with respect to the allocation formula to be used by the Commission. On this question, Section 12 (c) of the 1949 Act specifies that the Commission may give equitable consideration to acreage, pressure, open flow, porosity, permeability, deliverability and quality of gas, and to such other pertinent factors as may from time to time exist. It is significant that thickness of sand is not specifically named. Applying the rule of "ejusdem generis" it appears to be quite clear that the Legislature intended that proration should be primarily controlled by the ability of a well to deliver gas. Testimony was in conflict with respect to whether or not the deliverability of a well had any relation to recoverable reserves. This argument appears to be foreclosed by the specific direction contained in Section 12 (c) of the 1949 Act. Furthermore, I believe it can be stated definitely, that gas in place as measured by sand thickness has only indirect relationship to recoverable reserves. Thus, sand thickness and testimony based thereon should not be considered by the Commission unless such testimony is tied in with the ability to recover the gas from the sand. Bottom hole pressures are a function primarily of gas in place; thus, the use of bottom hole pressures as of a given date, without comparison to some other date and some other pressure is not

significant with respect to the amount of recoverable reserves that can be obtained.

Pubco Development Corporation took the position that the allocation factor should be based on 100% deliverability times acreage. Its testimony was directed to the proposition that the Blanco-Mesa Verde reservoir was not a homogeneous mass, but was composed of various lenticular sands, and that there was communication between proration units with respect to certain of the sands but that there were no uniform stringers or lenses to be observed throughout the entire field. The effect of the testimony was to indicate impairment of the free flow of gas across the field, and that the drainage from one unit to another would be impeded because of lack of direct communication. By pyramiding variable factors which were stated to exist in the field, including variances in sand thickness, porosity, connate water saturation, and initial bottom hole pressures, Pubco contended that reserves for individual wells drilled in the pool could vary as much as 46.4 to 1. The effect of this testimony was to support deliverability as the sole variable factor to be considered by the Commission in establishing its allocation of gas. Further testimony was advanced by Pubco Development Corporation that initial variances in potential throughout the field was on the order of 33 to 1, which was well within the maximum possible variation of 43.4 to 1 as stated previously. Although this approach is also negative, in that the possibility of larger differentials in recoverable reserves justifies a proration formula based on initial potential and deliverability since it was demonstrated that such latter differential would be less than the possibility, this approach appears to be more logical than a position which would limit the differential in allowables to one factor only, namely, thickness of gross or net pay. Pubco recommended that the allocation formula be based entirely upon deliverability of the well against the acreage factor.

Phillips Petroleum Company took essentially the same position as Skelly Oil Company; advancing, however, an allocation factor of acreage times 75% acreage plus

25% deliverability. Testimony was advanced that the maximum differential net pay sand thickness was on the order of 3.55 to 1, and that any allocation formula which would permit a well to produce over 3½ times the production of any other commercial well in the field would inevitably result in impairing correlative rights. The selection by Phillips of a deliverability factor in the recommended allocation formula was in direct conflict to the testimony of its witnesses who stated unequivocally that deliverability had no relation to reserves. In addition to being contrary to Statutory requirements, Phillips position is inconsistent, in that it first rejects deliverability as a factor to be considered by the Commission then injects a low deliverability factor for purposes of adjustment between wells purely because of expediency. Phillips recognizes that reserves can vary from well to well, but does not by affirmative testimony attempt to support any basis for allocation from well to well except that of deliverability. It could well be argued, based on testimony advanced by Phillips, which was purely negative, that the Commission could easily assign allowables based upon the current market quotation of the Company's stock provided such allowable did not exceed the maximum ratio of 3.55 to 1. Furthermore, examination of Phillips' own exhibits (Phillips Exhibits 3 and 7) and the admission of its own witness, clearly indicates that the recommendation of 75% acreage plus 25% deliverability times acreage would discriminate in favor of the weaker wells in the field insofar as 97% of the wells in the field are concerned. Using Phillips own exhibits again, and testimony of its witness, we find that use of 50% acreage plus 50% deliverability times acreage again results in discrimination among 97% of the wells in the field. In this connection your attention is directed to the testimony of Mr. Cullender, during the course of which he testified that the use of the formula based on 25% acreage plus 75% deliverability times acreage, would result in a disparity of something less than 6 to 1 for 97% of the wells. In this connection attention is directed to the testimony placed in the record by the Commission's witness to the effect that based on

thickness alone you could have a disparity of as much as 5½ to 1. Each of the Commission's witnesses testified that the approach they took was on the most conservative basis. The Commission should bear in mind that in allocating the gas to be produced the Commission should not utilize the most conservative basis for the establishment of recoverable reserves, but should attempt to give full weight to all factors which are known to exist so as to allocate the gas upon as fair a basis as possible. Thus, some weight, of necessity, must be given to the known variances in permeability, connate water saturation, and porosity, all of which must be taken into consideration in determining the amount of recoverable reserves. In my opinion, the testimony in the record sustains a differential well in excess of 10 to 1 throughout the entire pool. It, therefore, appears to me that based upon Phillips own testimony that the minimum allowance for deliverability should be on the order of 75% deliverability times acreage plus 25% acreage.

El Paso Natural Gas Company took the position that there was a direct relationship between the initial potential of the well and the net effective pay. So far as we can ascertain, from the record made before the Commission, this testimony is the only testimony which affirmatively establishes a connection between recoverable reserves and an allocation formula. The testimony supports the validity of an order of the Commission which will establish the variances in allowables based upon initial potential followed by deliverability tests. El Paso recommended that the allowable be based upon 75% deliverability times acreage plus 25% acreage. It is our opinion that the only order which the Commission may enter which will be supported by substantial evidence is an order which will give full weight to deliverability. Stanolind Oil and Gas Company supports the position taken by El Paso that the allocation of gas should be on a basis of 100% deliverability times acreage.

Southern Union Gas Company took the position that the allocation formula should be on the basis of 50% deliverability times acreage plus 50% acreage. Cross examination developed, however, that Southern Union's investigation and testimony was based entirely upon reserves in place. Because of the statement by the witness for Southern Union that if the Commission is required to allocate gas based on recoverable reserves that such requirement would alter his conclusions, it is my opinion that the Commission is required to disregard all of the testimony advanced by Southern Union Gas Company. However, it may be stated that Southern Union's position was essentially that of Skelly and Phillips, in that it recommended that the Commission utilize arbitrary factors which would result in a differential lower than that considered by each of the companies to represent the variances in reserves in place. The comments heretofore made, therefore, with respect to this negative approach would apply also to the position taken by Southern Union.

Southern Union recommended, also, that the Commission consider the imposition of maximum and minimum allowables. We should like to join with Southern Union with respect to the imposition of a minimum allowable, but suggest to the Commission that the minimum allowable should take into consideration economic factors relating to continued profitable operations. The question of incentive discussed by Southern Union's witness does not appear to be a matter which should concern the Commission in that we do not believe that any person would drill a gas well just for the purpose of acquiring a minimum allowable with a payout of six years. It appears that the net effect of arguing for minimum allowables from the standpoint of incentive is to place the Commission in the position of insuring profitable operations, including drilling. In this connection, Section 13 (d) of the 1949 Act stresses continued operation and premature abandonment as the criteria to be followed by the Commission.

With respect to maximum allowables it is our feeling that such recommendation be disregarded by the Commission as unduly hampering the delivery of gas, and on the testimony before the Commission in this case would of necessity be arbitrary. Certainly the selection of a six-year payout figure is arbitrary and has no reasonable relationship to whether or not a person would or would not drill a well or would or would not continue to operate the well. However, if the Commission feels that the record as made reflects a need to limit the few wells in the field which show a great disparity from the average, either because of a belief that the deliverability tests are not accurate or because of the belief that the tests do not truly represent the correct disparity in recoverable reserves, then the maximum allowable could possibly be supported by the record, but it would not be supported at the 2½ million cubic feet per day recommended by Southern Union. Furthermore, it is our considered opinion that the imposition of a maximum allowable would require that the maximum be flexible and bear some relationship to the total allowables granted for the entire field; otherwise, its imposition defeats the entire purpose of allocating gas so as to supply the market and so as to give effect to the recoverable reserves in the field.

If the Commission should determine that maximum allowables should be imposed, it is our considered opinion that the use of any allocation formula between proration units other than of 100% deliverability times acreage would be arbitrary and capricious. The record does not indicate that any substantial number of wells have such a great disparity in deliverability from the average so as to materially affect the total quantity of gas to be produced by such high productive wells. If a maximum allowable is imposed, then in order to give proportionate adjustments among the wells in the field the formula would require the use of 100% deliverability as a factor, after the top productive wells have been so limited.

In conclusion, it is our recommendation that the Commission adopt the only formula supported by the evidence in the record, namely, 100% deliverability times acreage. This position is the one taken by Stanolind Oil and Gas Company at the time this matter was first heard by the Commission, and we have seen no evidence and know of no evidence which has altered the conclusion made at that time. Commenting briefly upon the concession made by El Paso, that they would accept a formula of 75% deliverability times acreage plus 25% acreage, I consider that such concession is purely in the nature of compromise, and is not supported by the record. Although we are interested in maintaining a fair and consistent position before the Commission, we cannot in the face of the record recommend the adoption of any formula other than 100% deliverability times acreage.

We are attaching a copy of proposed Rules for your consideration.

Respectfully submitted,

James K. Smith

JAMES K. SMITH
Division Attorney
STANOLIND OIL AND GAS COMPANY

JKS:rb

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION
OF STANOLIND OIL AND GAS COMPANY FOR
THE AMENDMENT OF ORDER NO. R-110,
DATED NOVEMBER 9, 1951, RELATING TO
THE BLANCO (MESAVERDE) POOL,
SAN JUAN COUNTY, NEW MEXICO

ORDER OF THE COMMISSION

BY THE COMMISSION:

This case came on for hearing at _____ o'clock a.m. on _____, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this _____ day of _____, 19___, the Commission, a quorum being present, having considered the testimony adduced, the exhibits received, the statements of interested parties, the official records of this Commission and other pertinent data, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given, the Commission has jurisdiction of this cause.

(2) That the Commission, for the purpose of preventing waste and for the protection of correlative rights, should amend Order No. R-110 to provide for a definite method of allocating gas between proration units in the pool.

IT IS THEREFORE ORDERED:

That Section 11 of Commission Order R-110, dated November 9, 1951, is hereby amended to read as follows:

SECTION 11 - GAS WASTAGE:

Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut-in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

A. The Commission, after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Gas Pool, and other relevant data, and shall fix the allowable production of the Blanco Gas Pool, and shall allocate production among the gas wells in the Blanco Gas Pool upon a reasonable basis with due regard to correlative rights.

B. PRORATION UNITS

(1) For the purpose of gas allocation in the Blanco Gas Pool, a standard proration unit shall consist of between 318 and 322 contiguous surface acres substantially in the form of a rectangle, which shall be a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit not conforming to the above requirements may be formed after notice and hearing by the Commission or as outlined in Paragraph (2). Any proration unit containing less than 318 acres or more than 322 acres shall be a non-standard unit and its allowable shall be decreased or increased to that proportion of the standard unit allowable that the number of acres contained therein bears to 320 acres. Any standard

proration unit consisting of between 318 and 322 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

(2) The Secretary of the Commission shall have authority to grant an exception to Paragraph B(1) without notice and hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of less acreage than a standard proration unit.

(b) The acreage assigned to the non-standard unit lies wholly within a legal half section and contains a well capable of producing gas into a gas transportation facility on the date of this order.

(c) The operator receives written consent in the form of waivers from all operators in the adjoining 320-acre proration units.

C. At least 30 days prior to the beginning of each gas proration period, the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste within the ensuing proration period. "Preliminary Nominations" shall be submitted on a form prescribed by the Commission.

D. Each month, the Commission shall cause to be submitted by each gas purchaser its "Supplemental Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration month from the Blanco Gas Pool. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month together with an adjusted allowable computation for the second preceding month. Said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowables assigned the top allowable units shall be reduced proportionately, and in the event the allowable assigned is less than the production, then the allowables assigned the top allowable units shall be increased proportionately. "Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the Blanco Gas Pool delivering to a gas transportation facility or lease gathering system, and shall include in the proration schedule of the Blanco Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the supplemental nominations together with any adjustment which the Commission deems advisable. The allocation to a pool remaining after subtracting the capacity of marginal units shall be divided and allocated ratably among the non-marginal units in the proportion that the product of the acreage times the deliverability contained in each unit bears to the summation of the products of these factors for all such proration units in the field, provided that the Commission shall set a minimum allowable, to be determined after study of deliverability tests and other factors, which shall be allocated to any well whose allowable as calculated by the method outlined above is a lesser figure.

E. Underproduction: The dates 7:00 A.M., January 1, and 7:00 A.M. July 1, shall be known as balancing dates, and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled. If at the end of the first succeeding proration period, a greater amount of allowable remains unproduced than was carried forward as underproduction, the amount carried forward to the second succeeding period shall be the total underproduction less the amount carried forward to the first succeeding period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

F. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced, it shall be shut in and its current monthly allowable charged against said overproduction until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

G. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

H. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

I. The monthly gas production from each gas well shall be metered separately and the gas production therefrom shall be submitted to the Commission on Form C-115 so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, treaters, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

J. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said "taker" to submit a nomination.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

R. R. SPURRIER, Member and Secretary

Case 330 A

MAIN OFFICE OCC
1954 JUL 12 AM 9:18

Three States Natural Gas Company

SEVENTEENTH FLOOR CORRIGAN TOWER

DALLAS 1, TEXAS

July 9th, 1954

The Oil Conservation Commission
State of New Mexico
State Capitol Building
Santa Fe, New Mexico

Re: Recommended Order, Case 330,
Proration - Blanco Mesa Verde
Field, New Mexico

Gentlemen:

Three States Natural Gas Company does not operate in the Blanco Mesa Verde Field, but has overriding royalty interests of 8½% in more than 54 net Mesa Verde wells, also overriding royalty interests from 5% to 20% in at least 6 additional wells. Probably 40 additional Mesa Verde wells will be drilled under similar farmout agreements. Revenue is received by this Company from an average net volume of 500 million cubic feet of gas per month.

From the above figures you can determine that we are vitally interested in an equitable solution to the proration problem. We believe that allocation of 75% of withdrawals based on deliverability times acreage and 25% of withdrawals based on acreage will protect the correlative rights of both marginal and non-marginal wells.

The Three States Natural Gas Company urges the adoption of the attached Order for the allocation of gas withdrawals from the Blanco Mesa Verde Gas Field of San Juan and Rio Arriba Counties, New Mexico.

Very truly yours,

THREE STATES NATURAL GAS COMPANY

By: John C. McGuire
President

JCG:LH

THREE STATES NATURAL GAS COMPANY

PROPOSED RULES AND REGULATIONS
FOR THE BLANCO MESAVERDE GAS POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS.

RULE 1. Any well drilled a distance of one mile or more from the outer boundary of the Blanco Mesaverde Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile from the outer boundary of the Blanco Mesaverde Gas Pool shall be spaced, drilled, operated and prorated in accordance with the Regulations in effect in the Blanco Mesaverde Gas Pool.

RULE 2. Each well drilled or recompleted within the Blanco Mesaverde Gas Pool shall be located on a tract consisting of not less than a half section of approximately 320 surface contiguous acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys.

RULE 3. Each well drilled within the Blanco Mesaverde Gas Pool shall be located in the northeast or southwest quarter of the section but shall not be drilled closer than 660 feet to any outer boundary line of such quarter section nor closer than 330 feet to a quarter-quarter section or subdivision inner boundary nor closer than 1320 feet to a well drilling to or capable of producing from the same pool.

RULE 4. The Secretary of the Commission shall have authority to grant exception to the requirements of Rules 2 and 3 where application has been filed in due form and such exception is required because of conditions resulting from previously drilled wells in the area or, in the case of Rule 3, the necessity of exception is based on topographic conditions.

Applicants shall furnish all operators of leases offsetting the lease containing subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all such operators, together with a written stipulation that all such operators have been properly notified. The Secretary of the Commission shall wait at least 20 days before approving any such exception and shall approve such exception only in the absence of objection of any offset operators. In the event an operator objects to the exception the Commission shall consider the matter only after proper notice and hearing.

RULE 5. The provision of Statewide Rule 104 Paragraph (k), shall not apply to the Blanco Mesaverde Gas Pool.

RULE 6. The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Mesaverde Gas Pool and other relevant data and shall

fix the allowable production of the Blanco Mesaverde Gas Pool, and shall allocate production among the gas wells in the Blanco Mesaverde Gas Pool upon a reasonable basis with due regard to correlative rights.

RULE 7. A. For the purpose of gas allocation in the Blanco Mesaverde Gas Pool a standard proration unit shall consist of approximately 320 contiguous surface acres consisting of the North, South, East or West half of a section and being a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in paragraph B. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

B. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A without notice and hearing:

1. Where the unorthodox size or shape of the tract is due to a variation in legal subdivision of the U. S. Public Land Surveys; or

2. Where application has been filed in due form and where the following facts exist and the following provisions are complied with:

a. The acreage assigned the non-standard unit lies wholly within a legal section.

b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

(2) a list of names and addresses of all operators outlined in paragraph (1), together with a stipulation that proper notice has been given said operators at the addresses given and no objection is received by the Commission from such operators within 20 days after the Commission receives such application.

d. The entire non-standard proration unit may reasonably be presumed to be productive of gas.

e. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

C. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A after notice and hearing, when the operator is unable to comply with the provisions of Rule 7 B.

GAS ALLOCATION

RULE 8. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Mesaverde Gas Pool.

When a purchaser of gas, after filing its nominations for the proration period shall find that its requirements for gas have increased or decreased from the amount nominated for any month during the proration period, such purchaser shall indicate its revised estimated requirements during such month by filing supplemental nominations with the Commission at least three days prior to the regular hearing of the Commission for the month preceding such changed requirements.

All nominations shall be filed on a form prescribed by the Commission.

RULE 9. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month, together with an adjusted allowable computation for the second preceding month, said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowable assigned the non-marginal units shall be reduced proportionately; and in the event the allowable assigned is less than the production, then the allowable assigned the top allowable units shall be increased proportionately.

The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool remaining after subtracting the capacities of marginal units shall be divided and allocated among the non-marginal units in the following manner: seventy-five per cent (75%) of such remaining allocation shall be divided among the non-marginal wells in the proportion that the product of each individual well's calculated deliverability and acreage bears to the sum of such products for all the non-marginal wells. The other twenty-five per cent (25%) of such remaining allocation shall be divided among the non-marginal wells in the proportion that the acreage assigned the proration unit of each well is to the sum of the acreage assigned the proration units of all non-marginal wells. The calculated deliverability mentioned above shall be that deliverability as determined by a test taken in accordance with the provisions of Order No. R-333 or Order No. R-333A of the New Mexico Oil Conservation Commission.

BALANCING OF PRODUCTION

RULE 10. Underproduction: The dates 7:00 A. M., March 1, and 7:00 A. M., September 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the first succeeding proration period in addition to the normal gas allowable for such succeeding period. That portion of such cumulative underproduction carried forward into the first succeeding proration period, which is not made up during said period shall be deducted from the total underproduction at the end of the period, resulting in only that volume of underproduction accrued during said period being carried forward as cumulative underproduction into the next succeeding proration period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

RULE 11. Overproduction: An operator will be allowed to overproduce a well during a proration period and to accumulate and carry over such overproduction into the first succeeding proration period in an amount not in excess of the total allowable assignable to the well based on nominations for the first succeeding proration period. Should the allowable so calculated be less than the accumulated overproduction at the beginning of the first succeeding proration period, the well must be shut-in until the overproduction has been reduced to such allowable. Should the well's cumulative status not be brought in balance during the first succeeding proration period, that overproduction accumulated at the end of the first succeeding proration period must be brought in balance during the second succeeding proration period or the well must be shut-in at the end of the second succeeding proration period until its cumulative status is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 12. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 13. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 14. The monthly gas production from each gas proration unit shall be metered separately and the gas production therefrom shall be reported to the Commission by the

operator so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, heaters, treaters, combustion engines and other similar lease equipment shall not be charged against the well's allowable.

Copies of Form C-115, Monthly Production Report, submitted in compliance with Rule 14, shall be distributed by the operator as follows: Original to Oil Conservation Commission, Box 871, Santa Fe; two copies to Oil Conservation Commission, Box 697, Aztec, New Mexico.

MAIN OFFICE OCC
1954 JUL 12 AM 9:25

Case 330A

SOUTHERN UNION GAS COMPANY
BURT BUILDING
DALLAS 1, TEXAS

July 9, 1954

New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Gentlemen:

Forwarded herewith, for consideration by the Commission in Cases No. 330 and 330-A, are three copies of proposed rules and regulations for the Blanco-Mesaverde Gas Pool. Particular attention is called to the following recommendations of Southern Union Gas Company, as reflected in such proposed rules:

1. A proration formula (which we believe to be the fairest for everyone concerned in the light of all the evidence adduced at the hearing) as set forth in our proposed Rule 5(b), involving

(a) the allocation of 50% of allowable on the basis of acreage and 50% of allowable on the basis of acreage times deliverability,

(b) a minimum allowable of 350 MCF per day, to encourage the ultimate recovery of greater quantities of gas from the Pool, and

(c) a maximum allowable of 2,500 MCF per day, in order to minimize probable drainage.

2. Balancing dates of February 1 and August 1, which will put some warm and some cold months into each balancing period without coinciding with the January 1--July 1 balancing dates in effect in Lea County. See our proposed Rule 6.

3. Making the use of supplemental nominations optional rather than mandatory. See our proposed Rule 5(a).

Our proposed Rules 11-19 generally conform to those currently in effect for the Pool. We have, however, suggested several amendments to the present text of a clarifying nature, and have suggested one change of substance in Rule 11(a), i.e., lowering the pressure for the testing of surface casing from 1,000 psi. to 500 psi., in keeping with what we believe to be adequate good field practice.

Respectfully submitted,

SOUTHERN UNION GAS COMPANY

By A. S. Grenier
A. S. Grenier,
Attorney

ASG:FG
Encl.

RULES FOR BLANCO-MESAVERDE GAS POOL,
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO,
PROPOSED BY SOUTHERN UNION GAS COMPANY
IN CASE NO. 330-A

APPLICABILITY OF RULES

RULE 1. (a) The following special rules and regulations for the Blanco-Mesaverde Gas Pool (herein referred to as the "Pool") shall be limited in their application to the productive sands which are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde Formation.

(b) All additional lands located within one mile of any land in the Pool, as currently defined or as it may be hereafter extended, shall conform to these rules and regulations; and by order of this Commission the Pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed, on the basis of additional developments, to be capable of producing gas from the Mesaverde Formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from such formation.

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS

RULE 2. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless:

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the Pool;

(b) Such drilling unit be in the shape of a rectangle, except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit; and

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions, with further tolerance to be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

PRORATION UNITS

RULE 3. (a) For the purpose of gas allocation in the Pool, a standard proration unit shall consist of between 315 and 325 contiguous surface acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in Paragraph (b) of this Rule. Any allocation

unit containing less than 315 acres or more than 325 acres shall be a non-standard unit. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 3 (a) without notice and hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with:

1. The nonstandard unit consists of less acreage than a standard proration unit.

2. The acreage assigned to the nonstandard unit lies wholly within a legal section and contains a well capable of producing gas into a gas transportation facility on the date of this order.

3. The operator notifies in writing the Commission and all operators in the adjoining 320 acre proration units of the operator's intention to apply for an exception to Rule 3 (a), and no objections are voiced to the Commission by any of said operators within a period of fifteen (15) days after the copies of such notice are mailed.

(c) Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the Pool not conforming to the foregoing requirements of these Rules if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the Pool in the absence of such exception, or, irrespective of such finding, if the Commission shall find that by reason of all circumstances an exception is proper for the prevention of waste, or to prevent undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law, express or implied.

(d) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract which is smaller than a standard proration unit shall not be deprived of the right to drill on and produce from such tract if same can be done without waste, but in such case the allowable production from such tract shall be reduced in accordance with the allocation formula hereinafter set out in Rule 5 (b).

GAS ALLOCATION

RULE 4. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Pool. The Commission shall consider the nominations of purchasers, actual production, and

such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste from the Pool within the ensuing proration period. Nominations shall be submitted on a form prescribed by the Commission.

RULE 5. (a) Whenever a gas purchaser, after filing its nominations for a proration period, shall find that its requirements for gas have increased from the amount nominated for any month during the proration period, such gas purchaser shall file with the Commission, not later than the 10th day of the preceding month, a supplemental nomination indicating its revised estimated requirements during such month. Supplemental nominations, if submitted, shall be on a form prescribed by the Commission. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas from the Pool for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month together with an adjusted allowable computation for the second preceding month. Said adjusted allowable shall be computed by comparing the total allowable assigned to wells in the Pool with the total actual production of gas therefrom, and by reapplying, on the basis of such total actual production, the allocation formula set out in Rule 5 (b).

(b) The Commission shall include in the proration schedule all gas wells in the Pool delivering to a gas transportation facility or lease gathering system, and shall also include in the proration schedule any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the Pool each month shall be equal to the sum of the nominations, together with any adjustment which the Commission deems advisable. The allocation of gas to wells in the Pool remaining after subtracting the capacities of marginal wells shall be divided and allocated ratably among the nonmarginal wells as follows:

(1) 50% shall be allocated to each well in the ratio that (a) the acreage allocated to such well as its proration unit bears to (b) the total acreage allocated to all nonmarginal wells in the Pool entitled to receive an allowable;

(2) 50% shall be allocated to each well in the ratio that (a) the product of multiplying such well's deliverability in M.C.F. per day (determined as provided in the Commission's Order No. R-333-A) by the number of acres allocated to such well as its proration unit (as provided in Rule 3 above) bears to (b) the total of the products of similar multiplications of such factors for all nonmarginal wells in the Pool entitled to receive an allowable; and

(3) In no event, however, shall any well be given an allowable (or an adjusted allowable as provided for in Paragraph (a) of this Rule) of less than 350 M.C.F. per day or more than 2,500 M.C.F. per day.

BALANCING OF PRODUCTION

RULE 6. Underproduction: (a) The dates 7:00 A.M., February 1, and 7:00 A.M., August 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addi-

tion to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled. If, at the end of the first succeeding proration period, a greater amount of allowable remains unproduced than was carried forward as underproduction, the amount carried forward to the second succeeding period shall be the total underproduction less the amount carried forward to the first succeeding period.

(b) If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

RULE 7. Overproduction: (a) A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced and has been overproduced throughout such proration period, it shall be shut in and its current monthly allowable charged against its overproduction at the end of such period until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

(b) The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 8. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well.

RULE 9. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 10. The monthly gas production from each gas well shall be metered separately and the gas production therefrom shall be submitted to the Commission on Form C-115 so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well, other than gas used on the lease for consumption in lease houses, treaters, combustion engines and other similar lease equipment, shall be charged against the well's allowable.

CASING AND CEMENTING PROGRAM

RULE 11. (a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cement shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before dril-

ling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remain dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job may be tested by building up a pressure of 500 p.s.i., closing the valves and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set using a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 p.s.i., closing the valves and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

TUBING

RULE 12. Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perforations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

SPECIAL EQUIPMENT

RULE 13. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 p.s.i. working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 p.s.i. shall be installed on all production strings and Bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each Bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

SAFETY REQUIREMENTS

RULE 14. Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

SHOOTING OF WELLS

RULE 15. Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned.

INITIAL POTENTIAL TEST

RULE 16. (a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eighth (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

PROTECTION OF MINERAL DEPOSITS

RULE 17. Since the Menefee coal beds bear some gas and since these coal beds are of noncommercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

GAS WASTAGE

RULE 18. Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to the lines of a gas purchaser shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

BRADENHEAD GAS

RULE 19. Bradenhead gas shall not be used in torches or expansively in engines or pumps, or be otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

SPECIAL DEFINITIONS

RULE 20. The term "marginal well", as used in these Rules, shall mean a well not capable of producing its allowable, as calculated by means of the allocation formula set forth in Rule 5 (b) above. The term "nonmarginal well", as used in these Rules, shall mean any well, other than a marginal well, which is entitled to an allowable.

RULE 21. The term "gas purchaser", as used in these Rules, shall mean any taker of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said taker to submit nominations as provided in Rules 4 and 5 above.

PUBCO DEVELOPMENT, INC.
BOX 1360
ALBUQUERQUE, NEW MEXICO

MAIN OFFICE OCC
1954 JUL 12 AM 9:33

July 7, 1954

Re: Written Summation of Pubco Evidence, Hearing Nos. 330 and 330-A

Oil Conservation Commission of the
State of New Mexico
Capitol Building
Santa Fe, New Mexico

Gentlemen:

Enclosed herewith please find original and two (2) copies of written summation of evidence offered by Pubco at the gas proration hearing June 21st and 22nd.

Yours very truly,

D. W. REEVES
President

DWR/h
Encls

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NOS. 330 and 330-A

AN ORDER PROMULGATING GAS
PRORATION FORMULA FOR THE
BLANCO-MESAVERDE GAS FIELD

WRITTEN SUBMISSION OF TESTIMONY AND EVIDENCE

PRESENTED BY PUBCO DEVELOPMENT, INC. (MEL.)

AN INTERESTED OPERATOR

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The relationship of well potential or deliverability to effective net sand or recoverable reserves on a field-wide basis was ably demonstrated by El Paso Natural Gas Company. Their findings demonstrated a direct relationship between effective net sand or recoverable reserves to well potential. Those opposing this contention have only been able to select certain individual offsetting or neighboring wells with relatively wide differences in potential or deliverability. These exceptional cases should be expected in a field where artificial stimulation is the common practice, and in so doing operators in some instances are able to increase their recoverable reserves by permitting gas to flow to the well bore from isolated sands in the drill site which ordinarily would not have had access to the well bore nor which would have contributed to recoverable reserves.

In a single instance one company witness suggested that whatever formula is promulgated by the Commission should include a specific maximum daily allowable. Such a maximum would in effect be a proration formula within a proration formula and would serve only to render ineffective the real purpose of the formula. A specific maximum daily allowable would be unjustified in the absence of positive evidence forcing the conclusion that drainage is at present occurring from well site to well site. The record does not reflect any such evidence. Pubco Development, Inc., respectfully contends that no maximum on daily production should be incorporated in the proposed gas proration formula. A proration formula based upon deliverability will allocate the market in proportion to the underlying recoverable reserves. No evidence based on reservoir performance was introduced to the effect that such a maximum would prevent waste or protect the correlative rights of interested parties. In the absence of such evidence a specific maximum would be arbitrary and confiscatory. Those operators who would ordinarily attempt to obtain greater recoverability through the use of more expensive completion methods would be discouraged from doing so. A specific maximum daily allowable would in effect put a premium on mediocrity.

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Testimony introduced showed that an additive acreage factor of 25% and deliverability times acreage factor of 75% would in effect eliminate 31.6% of the wells in the Blanco-Mesaverde Field from proration. A formula which eliminates to all intents and purposes one-third of the wells in the field from the burdens of proration is unjust, discriminatory and unreasonable. Any increase in the additive acreage factor with a decrease in the deliverability times acreage factor increases the number of wells in effect eliminated from proration and thereby adds to the unjust, unfair and unreasonable results caused by the additive acreage factor.

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Respectfully submitted:

PUBCO DEVELOPMENT, INC.

By: D. W. REEVES
President

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

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IN THE MATTER OF THE HEARING
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CASE NOS. 330 and 330-A

AN ORDER PROMULGATING GAS
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WRITTEN SUMMATION OF TESTIMONY
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PUBCO DEVELOPMENT, INC. (NSL)
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By: D. W. REEVES
President

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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IN THE MATTER OF THE HEARING
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WRITTEN SUMMATION OF TESTIMONY AND EVIDENCE PRESENTED BY PUBCO DEVELOPMENT, INC.(NSL) AN INTERESTED OPERATOR

July 8, 1954

INTER-OFFICE TRANSMITTAL SLIP

TO Richard Spurrier, State Geologist,
Oil Conserv. Comm.

FROM OFFICE OF THE GOVERNOR
Santa Fe, New Mexico.

( ) For Approval

( ) For Signature

( ) Note and Advise

( ) Note and Return

( ) For Your Files

( ) For Your Handling

Remarks:

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

In Mrs. Spurrier.

IN THE MATTER OF THE HEARING
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Those who indicated a preference to an additive acreage factor contended that correlative rights were not being protected and that a formula entirely based on deliverability would not give them this protection. It cannot be too highly emphasized that none concerned with the problem produced data based upon reservoir performance that indicated that correlative rights were not protected or that drainage was occurring. To the contrary, Pubco Development, Inc., demonstrated that four offset wells in the Blanco-Mesaverde Field have been producing under the same conditions and are producing, simultaneously with the gas, totally dissimilar non-retrograde hydrocarbons or fluids. It can only be concluded that these offset wells are withdrawing gas from an area within their drill sites while the wells are producing into the pipeline in the amount of their ability to produce. In our opinion, however, proration in the field, based primarily on deliverability, is required in order to insure that each well is permitted to produce and thus obtain its fair share of the market.

The relationship of well potential or deliverability to effective net sand or recoverable reserves on a field-wide basis was ably demonstrated by El Paso Natural Gas Company. Their findings demonstrated a direct relationship between effective net sand or recoverable reserves to well potential. Those opposing this contention have only been able to select certain individual offsetting or neighboring wells with relatively wide differences in potential or deliverability. These exceptional cases should be expected in a field where artificial stimulation is the common practice, and in so doing operators in some instances are able to increase their recoverable reserves by permitting gas to flow to the well bore from isolated sands in the drill site which ordinarily would not have had access to the well bore nor which would have contributed to recoverable reserves.

In a single instance one company witness suggested that whatever formula is promulgated by the Commission should include a specific maximum daily allowable. Such a maximum would in effect be a proration formula within a proration formula and would serve only to render ineffective the real purpose of the formula. A specific maximum daily allowable would be unjustified in the absence of positive evidence forcing the conclusion that drainage is at present occurring from well site to well site. The record does not reflect any such evidence. Pubco Development, Inc., respectfully contends that no maximum on daily production should be incorporated in the proposed gas proration formula. A proration formula based upon deliverability will allocate the market in proportion to the underlying recoverable reserves. No evidence based on reservoir performance was introduced to the effect that such a maximum would prevent waste or protect the correlative rights of interested parties. In the absence of such evidence a specific maximum would be arbitrary and confiscatory. Those operators who would ordinarily attempt to obtain greater recoverability through the use of more expensive completion methods would be discouraged from doing so. A specific maximum daily allowable would in effect put a premium on mediocrity.

Any proration formula which included an additive acreage factor would in effect subsidize wells with below average reserves at the expense of those with average or above average reserves, destroying the incentive of

many operators and forcing them to invest their risk capital in other areas.

Testimony introduced showed that an additive acreage factor of 25% and deliverability times acreage factor of 75% would in effect eliminate 31.64% of the wells in the Blanco-Mesaverde Field from proration. A formula which eliminates to all intents and purposes one-third of the wells in the field from the burdens of proration is unjust, discriminatory and unreasonable. Any increase in the additive acreage factor with a decrease in the deliverability times acreage factor increases the number of wells in effect eliminated from proration and thereby adds to the unjust, unfair and unreasonable results caused by the additive acreage factor.

Initial potential and deliverability are the only factors known for every well in the field which are directly related to the recoverable gas reserves and upon which an equitable proration formula can be based with a desirable degree of accuracy.

Pubco Development, Inc., in the interest of avoiding waste and protecting the rights of all interested operators, and to protect the incentive and investment of those who through careful selection and operation have obtained better than average recoverable reserves, submits the following individual well formula for consideration and adoption by the Commission:

Well Allowable = Deliverability X Acreage Factor X Proration Factor.

Where: Deliverability determined under rules promulgated by the Oil Conservation Commission

$$\text{Acreage Factor} = \frac{\text{Acres in well site}}{320}$$

$$\text{Proration Factor} = \frac{\text{Market in MCF}}{\text{Sum of deliverability of all wells}}$$

Respectfully submitted:

PUBCO DEVELOPMENT, INC.

By: D. W. REEVES
President

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

* * *

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE NOS. 330 and 330-A

AN ORDER PROMULGATING GAS PRORATION
FORMULA FOR THE BLANCO-MESAVERDE GAS
FIELD

WRITTEN SUMMATION OF TESTIMONY
AND EVIDENCE PRESENTED BY
PUBCO DEVELOPMENT, INC.(NSL)
AN INTERESTED OPERATOR

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO FOR THE PURPOSE OF CONSIDERING:

CASES 330 and 330-A
(consolidated)
ORDER NO. R-_____

THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR AN ORDER AMENDING ORDER R-110 RELATING TO THE BLANCO-MESAVERDE GAS POOL, SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO.

AND ALSO:

THE APPLICATION OF THE OIL CONSERVATION COMMISSION UPON ITS OWN MOTION FOR AN ORDER PROMULGATING RULES AND REGULATIONS AFFECTING AND CONCERNING THE BLANCO-MESAVERDE GAS POOLS, SITUATED IN SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

These causes came on for hearing at 9:00 o'clock a.m. on April 15, 1954 and June 21, 1954 before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this _____day of __ _____1954, the Commission, a quorum being present, having considered the testimony adduced and the exhibits received at said hearings, and being fully advised in the premises,

FINDS:

(1) That due notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this case and the subject matter thereof.

(2) That under the date of February 25, 1949, the Commission issued its Order 799 creating the Blanco-Mesaverde Gas Pool. That Order 799 defined the vertical and horizontal limits of the Blanco-Mesaverde Gas Pool

and that by subsequent orders the Commission extended the horizontal limits of the Blanco-Mesaverde Gas Pool.

(3) That under the date of November 9, 1951 the Commission issued Order No. R-110, amending and revising Order 799, to provide for 320 acre proration units, drilling and pipe cementing procedures, well spacing, and other pertinent rules.

(4) That the producing capacity of the gas wells in the Blanco-Mesaverde Gas Pool is greater than the market demand of gas from the Blanco-Mesaverde Gas Pool.

(5) That for the purpose of preventing waste and for the protection of correlative rights Order R-110 should be amended to provide a method of allocating gas between proration units in the Blanco-Mesaverde Gas Pool.

IT IS THEREFORE ORDERED:

(1) That Order R-110, dated November 9, 1951 is hereby amended to read as follows:

Check spacing Rule for (Rules 1-4 Inclusive)

Section 15: Gas Proration and Allocation

Rule 1. (a) The acreage allocated to a gas well for proration purposes shall be known as the Gas Proration Unit for that well. For the purpose of Gas Allocation in the Blanco-Mesaverde Gas Pool, a standard proration unit shall consist of between 318 and 322 contiguous surface acres, substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys; provided however, that a non-standard gas proration unit may be formed after notice and hearing ~~or under the provisions of paragraph (b) of this rule.~~ (OK) Any proration unit containing less than 318 acres or more than 322 acres shall be a non-standard proration unit. The allowable production from any non-standard proration unit as compared with the allowable production therefrom if such tract were a standard unit shall be in the ratio of the ~~once~~ area of such non-standard proration unit expressed in acres to 320 acres. Any gas proration unit containing between 318 and 322 acres shall be considered to contain 320 acres for the purpose of computing allowables.

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 1 (a) without Notice and Hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with;

1. The non-standard gas proration unit consists of contiguous quarter-quarter sections and/or lots.

2. The non-standard gas proration unit lies wholly within a single governmental section.

3. The entire non-standard gas proration unit may reasonably be presumed to be productive of gas.

4. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

5. The applicant presents written consent in the form of waivers from (a) all operators owning interests in the section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit, and (b) all operators owning interests within 1500 feet of the well to which such gas proration unit is proposed to be allocated.

6. In lieu of paragraph 5 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to form such non-standard gas proration unit. The Secretary of the Commission may approve the application if, after a period of 30 days following the mailing of said notice, no operator has made objection to formation of such non-standard gas proration unit.

Rule 2. At least 30 days prior to the begining of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months from the Blanco-Mesaverde Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other

daily
a minimum well allowable
for the ensuing proration period and
factors as may be deemed applicable in determining the amount of gas that may
from the pool
be produced without waste within the ensuing proration period. "Preliminary
Nominations" shall be submitted on a form prescribed by the Commission.
"A"

Rule 3. In the event a gas purchaser's market shall have increased or decreased, he may file with the Commission prior to the 10th day of the month a "supplemental" nomination, showing the amount of gas he actually in good faith desires to purchase during the ensuing proration month from the Blanco-Mesaverde Gas Pool. The Commission shall hold a public hearing between the ~~15~~ 13th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month.

Included in the monthly proration schedule shall be (a) a summary of the total pool allocation for that month showing nominations, and adjustments made for underage or overage applied from a previous month, (b) a tabulation of the net allowable and production for the second preceding month together with a cumulative overage or underage computation, (c) a tabulation of the current and net allowables for the preceding month, (d) a tabulation of current monthly allowables for the ensuing proration month, and (e) a tabulation of the acreage and deliverabilities assigned each well, and the factors assigned each well for use in calculating individual well allowables.

"Supplemental Nominations" shall be submitted on a form prescribed by the Commission.

The Commission shall include in the proration schedule the gas wells in the Blanco-Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco-Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. The Total the

Statement by the Gulf Oil Corporation
to the New Mexico Oil Conservation
Commission at Santa Fe, New Mexico
May 19, 1954

As this is written the latest Industry crude oil stock figures released by the Bureau of Mines are as of May 1, 1954, a total of 274,003,000 barrels. This is the highest level so far this year. It is an increase of 12,069,000 barrels over the low level of this year (March 6, 1954) when stocks were 261,934,000 barrels, an inventory which was considered staisfactory.

This build up of 12,069,000 barrels in stocks has taken place within the last eight weeks. It seems significant that this has been a constant build up, except for one week. The actual figures are:

Weeks Ending	Total	Increase (Decrease)
3/6/54	261,934,000	
3/13/54	263,174,000	1,240,000
3/20/54	263,898,000	724,000
3/27/54	266,942,000	3,044,000
4/3/54	268,547,000	1,605,000
4/10/54	269,236,000	689,000
4/17/54	268,196,000	(1,040,000)
4/24/54	269,647,000	1,451,000
5/1/54	274,003,000	4,356,000
Total		12,069,000

We feel that present crude stocks are not yet unwieldy or burdensome, but we do feel that they are too high. It should be recalled that a year ago (May 2, 1953) at which time stocks were reported to be 279,569,000 barrels, or some 5,500,000 higher than current stocks, they continued to increase throughout late spring, summer and early fall, to the excessive level of 287,831,000 barrels on October 17, 1953.

Subsequent action by some of the regulatory bodies had the effect of reducing allowable production and a fairly constant decrease in crude stocks began, ending up with the previously cited figure of 261,934,000 barrels as of March 6, 1954.

While the current level of crude stocks does not present too great an immediate problem, a continuation of the last eight week build up would soon require a rather severe cut-back in crude [illegible] and demand into proper balance.

The industry's real problem is the [illegible] nearly 176,000,000 barrels and [illegible] solution to this inventory [illegible]

recent reduction in crude runs to stills. As a minimum, this calls for bringing crude production into line with refinery runs.

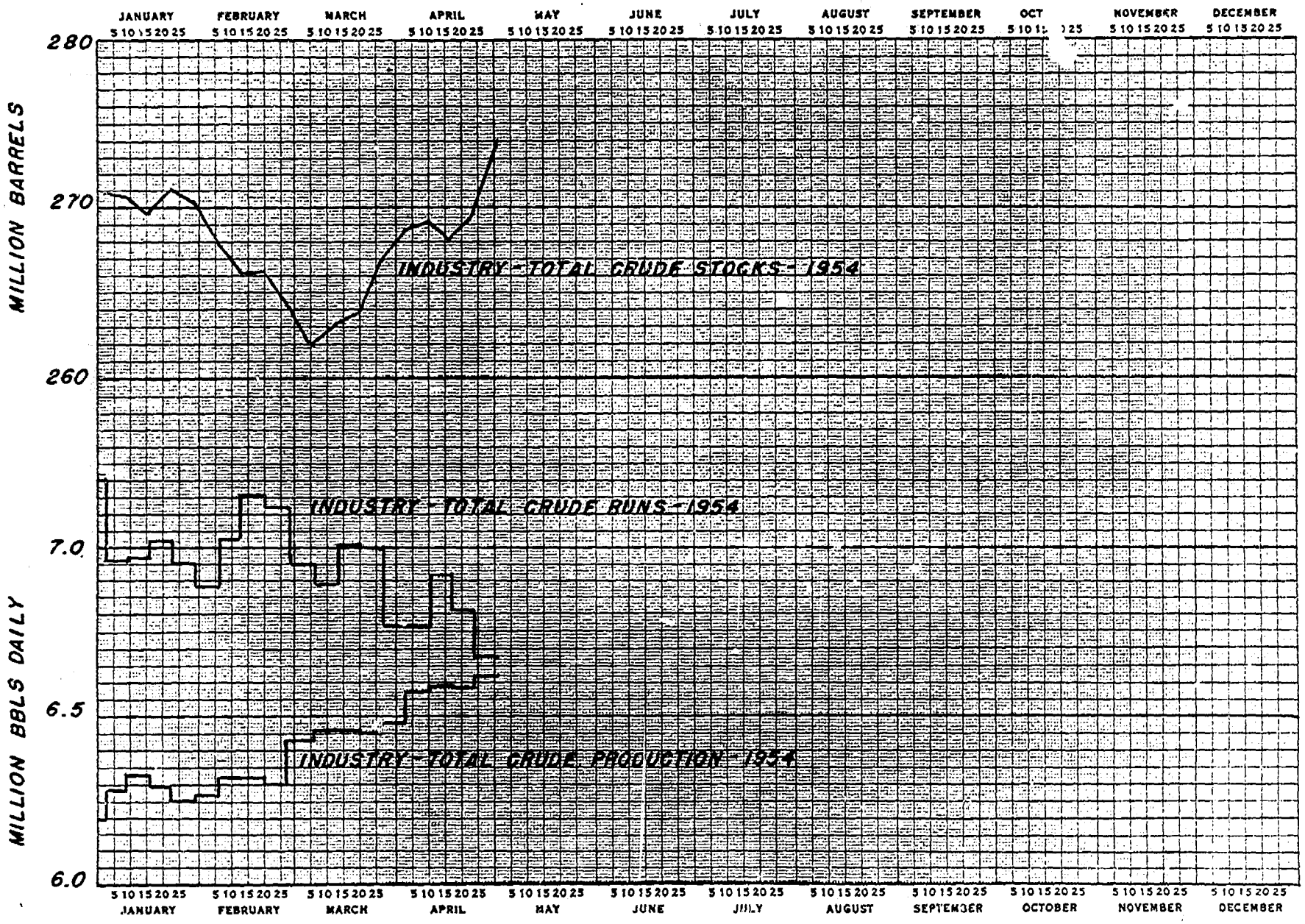
The attached chart graphically illustrates these opposing trends -- increasing production, decreased runs to stills and the resultant build up in stocks of crude oil.

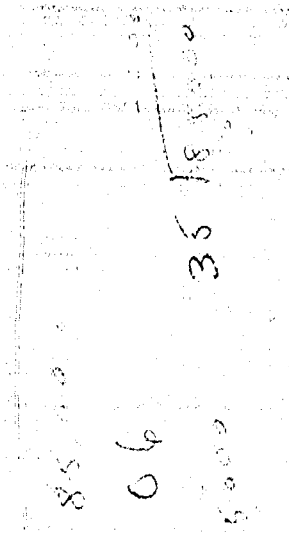
It is our feeling that an immediate effort should be made to bring crude stocks back to a more satisfactory level than they are now, say to 265,000,000 barrels.

In New Mexico, and in several other states, for the past several months allowables have been set materially in excess of purchaser's nominations. For instance, in New Mexico purchasers' nominations for May amounted to approximately 162,000 B/D. Against this the allowable production has been set at 235,000 B/D, including allowance of 10,000 B/ D for new completions. It is to be expected that actual production will fall short of allowable, but it seems conservative to estimate that actual production will amount to approximately 200,000 B/D, something more than 20% above what the purchasers nominated.

Gulf's own situation closely parallels that of industry as a whole. We had available some empty storage capacity, and to aid other operators we made a number of spot purchases of crude, which combined with our current runs, have resulted in an increase in our stocks, which now stand a bit high, although not yet too burdensome. However, continuance of such spot purchases along with current crude runs under present allowables, would soon make our own stocks unwieldy and, for the immediate future at least, we will not be in a position to make further spot purchases. It almost necessarily follows that, if allowables are continued at present levels, the operators from whom we had been buying will be long on crude and will find it difficult, if not impossible, to hold their excess oil in storage.

Gulf's nomination in New Mexico for May was 12,000 B/D. Indications are that, under the allowables that have been set, our actual purchases will be about 13,500 B/D. We have no current need for anything beyond the 12,000 B/D we nominated for May and we need no more than this for June; therefore, we have reiterated the 12,000 B/D nomination. This really represents the amount of oil we want to buy.


JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCT
NOVEMBER
DECEMBER
5 10 15 20 25
280
270
260
MILLION BARRELS
INDUSTRY - TOTAL CRUDE STOCKS - 1954
7.0
6.5
6.0
MILLION BBLS DAILY
INDUSTRY - TOTAL CRUDE RUNS - 1954
INDUSTRY - TOTAL CRUDE PRODUCTION - 1954



OCC EXHIBITS CASES 330, 330-A
June 21-23, incl Hearing 1954

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
RECEIVED
NOV 1 1951

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

In the Matter of the Petition of STANOLIND OIL AND GAS COMPANY for the Enlargement of the Limits of the Blanco (Mesa Verde) Pool, San Juan County, New Mexico, and for the Establishment of an Equitable and Definite Standard for the Production of Gas in the Blanco (Mesa Verde) Pool, and for the Establishment of Gas Allowables in Said Pool.

Case No. 330

PETITION

Comes now STANOLIND OIL AND GAS COMPANY, and respectfully petitions the Commission for the issuance of an order:

1. Enlarging the limits of the Blanco (Mesa Verde) Pool;

2. Making more definite and certain the provisions of Section 11 of said Order No. 799 which prescribes that wells should produce equitably by proration units in the Field; and

3. Providing in greater detail rules for the prevention of waste and the protection of correlative rights.

In support of the above, your Applicant shows and represents:

1. On March 7th, 1949, the Commission, in order to eliminate waste of natural resources, protect correlative rights, and other purposes, issued Order No. 799, establishing the limits of the Blanco (Mesa Verde) Gas Pool in San Juan County, New Mexico, fixed a general well spacing pattern of one well in a unit of 320 acres, provided regulations for the drilling of wells thereon, inhibited the waste of gas, and by Section 11 of said Order required the equitable production of wells by proration units, and made other provisions all as provided in said Order, reference to which is hereby made for greater certainty.

2. Likewise, on due notice and pursuant to a hearing held at the instance of the Commission, the Commission on September 20th, 1951, issued an Order No. R-69, enlarging the limits of the Blanco

(Mesa Verde) Gas Pool, reference to which order is hereby made for greater particularity as to the lands now embraced in the Blanco (Mesa Verde) Gas Pool.

3. The following described lands should likewise be embraced in the Blanco (Mesa Verde) Gas Pool, namely:

Township 32 North, Range 8 West:

Sections 1, 2, 3, 12, and 13

Township 30 North, Range 8 West:

Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 31 North, Range 8 West:

Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

by reason of the fact that said lands contain numerous prolific producing gas wells from the Mesa Verde formation and are located in the same general Field or common accumulation as the lands now included within said Pool as now defined by the Commission.

4. The amount of potential gas producible from the wells in the Pool is in excess of present markets and pipe line capacity for such gas, and this condition will be increasingly acute as the Field develops, and waste and drainage of gas will occur, and correlative rights in said Pool can not be protected unless the Commission limits and apportions production in said Pool on an equitable basis determined by the Commission, and otherwise acts so as to discharge its duties and responsibilities under the law.

5. Section 11 of said Order No. 799 is indefinite and uncertain in that it does not provide any standard by which it may be determined whether the wells producing in this Field produce equitably, and that in order to prevent waste, prevent drainage, and protect correlative rights, it is necessary that a definite standard for equitable production be fixed.

6. Each owner can best be afforded his opportunity to produce his equitable share of the gas and to recover the gas under his property by applying the test of deliverability against a uniform back pressure fixed by the Commission multiplied by acreage to each well drilled on a 320-acre unit in this area. In order to permit the pipe lines to supply their market demand at all times, advance tentative daily allowables for the calendar year should be set up for the gas wells connected to each transportation system, and these allowables should be recomputed and declared at the end of each year in proportion as the deliverability times acreage of each well bears to the deliverability times acreage of all connected wells in the Blanco (Mesa Verde) Pool, as applied to the actual field production for that year. There should also be provided a method and means to adjust underages and overages that occur in production from the wells in said Pool during each calendar year.

7. That such a standard can not well be placed in force, effect and operation before January 1st, 1953, for the reason that it will require some time to make tests for potential and deliverability of all the wells in the Field, determine over a period of time average working pressures of pipe lines, and to accumulate engineering data sufficient to intelligently fix a uniform back pressure that will prevent waste and protect adequately correlative rights and to make the other determinations necessary, and to set up the necessary machinery to put these standards in operation on a basis fair to all.

8. Notwithstanding this fact, it is desirable in order to protect correlative rights and to prevent the waste of gas to make some tentative regulation of the production of wells to the endthat production may be equitable during the calendar year 1952, and to that end, your Applicant shows and represents that for the calendar

year 1952, wells should be permitted to produce a tentative daily gas allowable in relation to the total market demand of the transportation facility to which each well may be connected in proportion as the tested open flow capacity of each well bears to the tested open flow capacity of all wells so connected, subject to adjustment at the end of the year for overages and underages which shall be redetermined at the end of the calendar year on the relation which the open flow capacity of each well bears to the aggregate open flow capacity of all wells in the Blanco (Mesa Verde) Pool, as applied to the actual field production for that year.

9. Provision should be made in and by said Order to the end that the owner of any well that has an underage during any calendar year as compared with its allowable shall have the right to make up said underage during the next calendar year in addition to its regular allowable for the current calendar year and to require thatthe owners of wells having an overage during any calendar year shall restrict their production during the next year to the extent necessary to equalize the same, and said Order should likewise provide that any well that does not during the ensuing calendar year equalize its overage for the preceding calendar year shall thereafter be shut in by the Commission until such overage is adjusted.

10. Provision should be made in the Order for pipe line nominations, the time and manner of making all well tests, the making of reports, and other detailed matters.

WHEREFORE, your Applicant requests that a hearing be ordered as required by statute in such case, that an early date therefor be fixed as provided by statute; and that on such hearing and after due consideration of such matters, the Commission issue an order in such form as will best prevent waste, prevent drainage, and pro-

test correlative rights, and save to each owner the opportunity to produce his fair share of the gas from the common accumulation.

Respectfully submitted,

_____

Attorney for Applicant.

FARMING

Formerly the Farmington Times Hustler—Established [illegible] 188

Dec. 15, 1951

States Case For Gas Proration

A spokesman for the Stanolind Oil and Gas Co. released a statement today setting forth the company's stand in asking for proration of gas production in the Blanco field.

Dec. 11 the Daily Times published an editorial column forum in which the objections to proration were outlined. The Times editorially opposed proration.

'It is our belief,' the newspaper stated, 'that proration of production is ultimately necessary as it applies to natural gas, or practially any other natural resource that can be exhausted or depleted uneconomically. We are convinced however, that this is not the time for proration of natural gas production in the San Juan Basin.

Below are the statement from Stanolind and the gist of the arguments advanced by opponents to proration.

Here is the statement by C. F. Bedford, production superintendent for the Stanolind Oil and Gas Company's North Texas-New Mexico division:

"A number of misleading statements have been made concerning the effect of the proposals to be made by Stanolind Oil and Gas Co. at the Blanco (Mesaverde) pool hearing Dec. 18. The hearing on gas proration is concerned with the Blanco pool only, and will not result in any orders affecting any other gas wells in New Mexico. A recent news report that our proposal calls for the testing of all gas wells in the state is false and completely without foundation.

"The proration of gas in the Blanco pool will not adversely affect any operator or group of operators by limiting production from their wells. It is designed to give all Blanco operators and royalty owners the opportunity of sharing equitably in production from the pool.

"Under the rules proposed by Stanolind, a purchaser of gas from the field would advise the New Mexico Conservation Commission in advance of its gas requirements from Blanco during the next proration period. The commission would then divide the total amount of gas required by all purchasers between all the connected wells in the field on an equitable basis.

"This is the fair and democratic way of taking gas from the field.

"Without a rule of this kind there would be nothing to prevent repeated heavier withdrawals of gas being made each month [illegible] not benefit in the long run at his neighbor's expense.

Here are the main arguments advanced by opponents of proration:

1. The supply of gas on top of the ground here has not met present demands, therefore demanding a continuing program of intensive drilling. Proration would discourage additional drilling, especially by smaller operators.

2. Comparable line pressures maintained in the Blanco area rate wells automatically as close as they could be rated mechanically at this time. Line pressures at well heads are all comparable in the Blanco area.

3. With the engineering data it would be difficult, if possible at all, to set up a workable means of testing without wasting much gas to the air. This assertedly would be necessary to stabilize the flow for accurate testing.

4. Most land and royalty owners' present incomes from wells would be reduced appreciably, if not drastically, if proration were put into effect.

5. Most companies and independent operators will admit that, when gas deliverability on top of the ground reaches and surpasses the demand, proration will be necessary and acceptable to all concerned. Many opponents of prorations assert that time is five years hence.

6. The character of the Mesa Verde formation in this area, those who oppose proration contend, makes it impossible to damage the sand by overproducing wells. In the case of the water drive, overproduction can damage a producing zone. Operators opposing proration declare there is [illegible] drive in this section of the San Juan Basin.

It is apparent that most operators in this area oppose proration at the present time.

Church Sei

NORTHSIDE
CHURCH OF CHRIST
"No Creed but the Bible"
316 North Auburn
W. J. Price, Minister

nday
ble classes: 10 a. m.
rning worship: 11 a. m.
ening worship: 7:30 a. m.
ednesday
dies Bible class 2:30 p. m.
ening class 7:30 p. m.

ASSEMBLY OF GOD
Locke and Broadway
Rev. Don E. Stover, Pastor
Sunday School, 9:45 A.M.
Morning Worship, 11 A. M.
Sunday Evening Service, 7:30
Young people Tuesday 7:30
Bible Study Friday 7:30

SEVENTH DAY ADVENTIST
Arrington Street
Elder Geo. Rasmussen, Pastor
Local Elder, Leal Lamoreaux
bbath School, 9:45 A. M.
ayer Meeting, Wed. 7:30 P. M.
ung Peoples Meeting, Fri P. M.

SACRED HEART
Catholic
Allen and Apache
Rev. Fr. Theophil W. Meyer
O. F. M.
nday — Mass 8 and 10 A. M
1st and 3rd Tuesday—Meeting C
C 7:30 p. m.
st Thursday—Meeting M. C.
m

ASEMBLIAS DE DIOS
609 South Behrend
Feliberto Serrano, pastor
Domingo por la manana 10-12
Domingo por la noche 7:30
Miercoles 7:30
Viernes 7:30

FREE METHODIST CHURCH
7 West Main St.
ev. William Folsom, Pastor
ght and Life hour,
oadcast over KIUP 8 a.m.
nday School, 10 a.m.
eaching Service, 7 p.m.
vangelistic Service, 7:30 p.m.
rayer Meeting, Wednesday eve
ng, 7:30 p.m.

FIRST METHODIST CHURCH
Miller H. Stroup, Pastor.
301 N. Behrend
45 A. M. — Sunday School
Mr. Emmett Walling, general superintendent.
1 A. M. — Divine Worship
Mrs. Edward Thomas, Jr., Director of Music; Mrs. Mildred Yager, Organist
15 P. M.—Methodist Youth Fellowship.
WSCS meets on the 2nd and 4th hursdays at 2:30 P. M.
Wesley Service Guild meets third hursday at 8 p. m.

CHURCH OF THE NAZARENE
American Legion Building
The Rev. D. L. Coon, acting astor.
Sunday services:
9:45 a.m. Sunday School

CHURCH OF CHRIST
Broadway and Lorena
Sunday:
10:00 a.m. Bible Study.
11:00 a.m. Worship.
1:15 p.m. KVBC.
7:30 p.m. Evangelistic Service.
Wednesday:
7:30 p.m. Bible Study.
Thursday:
7:30 p.m. Young People Meeting.

FIRST METHODIST CHURCH
AZTEC, N. M.
Charles W. Fields, Pastor.
Sunday Services:
9:45 a.m. Church School.
11:00 a.m. Morning Worship.
6:00 p.m. M. Y. F.
7:30 p.m. Evening Worship.
(Choir practice, 7:30 p.m. Thursdays)

CHRISTIAN REFORMED
NAVAJO MISSION
Rev. Heiman Schripsema, Supt
Chee Anderson, Assistant
Sunday—
All Navaje meeting, 10:30 a. m.
Sunday school, 10:30 a. m. English service, 4 p. m. Wednesday Bible Study club, 7 p. m.

UNITED PENTECOSTAL
Rev. Hubert W. Parks, pastor
Church in Jesus Name
119 E. Broadway
Sunday school, 10 a.m.
Devotional 11 a.m.
Evangelistic services, 7:30 p.m.
Friday Night — Young Peoples Meeting.

FAITH TABERNACLE
ASSEMBLY OF GOD
Sunday school—9:45 a. m.
Morning worship—11 a. m.
Evangelistic worship service—7:30 p. m.
Wednesday service 7:30
Thursday

Editor's note: The Blanco pool as is the case of every gas ... every oil pool in New Mexi... now under the jurisdiction of the Conservation Commission.

The Farmington Daily Times can not be the newspaper Bedford refers to in his reference to a newspaper report "that our proposal calls for the testing of all gas wells in the state." No such report has appeared in this newspaper, nor on the wire services to which the Daily News reports to which the Daily Times subscribes.

"The recent rapid development of gas resources in the Blanco (Mesaverde) pool of the San Juan Basin makes it imperative that production from wells in the pool be placed under the jurisdiction of the New Mexico Conservation Commission.

"The present position of gas has long been recognized in New Mexico, and other states, as being necessary to prevent waste by limiting production to market demand, and to protect correlative rights of all interest owners. In most oil and gas producing states, including Texas and Oklahoma, gas is also prorated.

Church Se

NORTHSIDE CHURCH OF CHRIST
"No Creed but the Bible"
316 North Auburn
W. J. Price, Minister

nday
ble classes: 10 a. m.
rning worship: 11 a. m.
ening worship: 7:30 a. m.
ednesday
dies Bible class 2:30 p. m.
ening class 7:30 p. m.

ASSEMBLY OF GOD
Locke and Broadway
Rev. Don E. Stover, Pastor
Sunday School, 9:45 A.M.
Morning Worship, 11 A. M.
Sunday Evening Service, 7:30
Young people Tuesday 7:30
Bible Study Friday 7:30

SEVENTH DAY ADVENTIST
Arrington Street
Elder Geo. Rasmussen, Pastor
Local Elder, Leal Lamoreaux
Sabbath School, 9:45 A. M.
Prayer Meeting, Wed. 7:30 P. M.
Young Peoples Meeting, Fri. P. M.

SACRED HEART
Catholic
Allen and Apache
Rev. Fr. Theophil W. Meyer
O. F. M.
nday — Mass 8 and 10 A. M
1st and 3rd Tuesday—Meeting C
C 7:30 p. m.
st Thursday—Meeting M. C. 8
m

ASEMBLIAS DE DIOS
609 South Behrend
Feliberto Serrano, pastor
Domingo por la mapana 10 1
Domingo por la noche 7:30
Miercoles 7:30
Viernes 7:30

FREE METHODIST CHURCH
7 West Main St.
ev. William Folsom, Pastor
ght and Life hour,
oadcast over KIUP 8 a.m.
nday School, 10 a.m.
eaching Service, 7 p.m.
vangelistic Service, 7:30 p.m.
rayer Meeting, Wednesday eve
ng, 7:30 p.m.

FIRST METHODIST CHURCH
Miller H. Stroup, Pastor
301 N. Behrend
45 A. M. — Sunday School
Mr. Emmett Walling, general superintendent.
A. M. — Divine Worship
Mrs. Edward Thomas, Jr., Director of Music; Mrs. Mildred Yager, Organist
15 P. M.—Methodist Youth Fellowship.
WSCS meets on the 2nd and 4th hursdays at 2:30 P. M.
Wesley Service Guild meets third hursday at 8 p. m.

CHURCH OF THE NAZARENE
American Legion Building
The Rev. D. L. Coon, acting astor.
Sunday services:
9:45 a.m. Sunday School

CHURCH OF CHRIST
Broadway and Lorena
Sunday:
10:00 a.m. Bible Study.
11:00 a.m. Worship.
1:15 p.m. KVBC.
7:30 p.m. Evangelistic Service.
Wednesday:
7:30 p.m. Bible Study.
Thursday:
7:30 p.m. Young People Meeting.

FIRST METHODIST CHURCH AZTEC, N. M.
Charles W. Fields, Pastor.
Sunday Services:
9:45 a.m. Church School.
11:00 a.m. Morning Worship.
6:00 p.m. M. Y. F.
7:30 p.m. Evening Worship.
(Choir practice, 7:30 p.m. Thursdays)

CHRISTIAN REFORMED NAVAJO MISSION
Rev. Herman Scharpenka, Supt
Chee Anderson, Assistant
Sunday—
All Navajo meeting, 10:30 a. m.
Sunday school, 10:30 a. m. English service, 4 p. m. Wednesday Bible Study club, 7 p. m.

UNITED PENTECOSTAL
Rev. Hubert W. Parks, pastor
Church in Jesus Name
119 E. Broadway
Sunday school, 10 a.m.
Devotional 11 a.m.
Evangelistic services, 7:30 p.m.
Friday Night — Young Peoples Meeting.

FAITH TABERNACLE ASSEMBLY OF GOD
Sunday school—9:45 a. m.
Morning worship—11 a. m.
Evangelistic worship service—7:30 p. m.
Wednesday service—7:30 p. m.
The Rev. R. C. Dobyns, pastor
805 East Main street

NAVAJO METHODIST MISSION
Willard P. Bass, Superintendent
Sunday School, 10 a. m.
Worship Service, 11 a. m.
"Training Navajo Youth for Christian Leadership."
Sunday School 10 A. M.
(Except during summer)

COMMUNITY PRESBYTERIAN
Donald D. Edwards, Pastor
Allen and Arrington
Sunday
9:45 A. M. Bible School with graded classes for all ages.
11:00 A. M. Morning worship and sermon.
7:00 P. M. Junior Endeavor Westminister Fellowship and study and discussion groups.

ST. JOHN'S EPISCOPAL
Orchard Ave
Rev. Fr. Edward Smith, Vic
Sunday Services
Morning Prayer, first and third Sundays each month, 11 a. m.
Holy Communion, second and fourth Sundays each month, 11 a. m.
Holy Communion every Sunday 30 a. m.
Church school 9:45 a. m.

LATTER DAY SAINT PROGRAM
Farmington First Ward
Bishop, Howard Goodman
Sunday School, 9 a. m.
Priesthood, 10:30 a m.
Relief Society, 2 p. m., Thursday
M.I.A. 7:45 p. m., Tuesday
Primary 4 p. m., Wednesday.

Farmington Second Ward
Bishop, L. L. Dillman

If You've C

22 Houses for Rent

FOR RENT small house, completely modern. Apply 612 Kathryn Street. Phone 3-5249.

WARM, sunny, clean, 3 bedroom home. $70.00 water paid (less on lease). 2-1474. Evenings.

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WHAT TO GIVE?

How about a beautiful little Love Bird, the color of New Mexico skies, to carry your Christmas greetings and remind her of you all year 'round? Children love them, too. We have three for sale. Cages only $6.95.

Plenty of Parking Space and coffee and doughnuts "on the house."

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See our group of very sharp Junior-Miss party and square dance skirts and blouses—taffeta, velvet, and metallic. Some really glitter. All very reasonably priced.

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TWO BEDROOM unfurnished house. Close to schools. Fenced yard. Dial 3-9466.

FOUR ROOM unfurnished house. $40.00, water paid. Inquire 511 Griffin St.

FURNISHED GUEST HOUSES on Stedman Ranch. Phone 3-7926.

25 Apartments For Rent

ONE BEDROOM apartment for rent in Alley Theater Building. Inquire Lensic Theater, or phone 2-6301.

409 E. PALACE—furnished or unfurnished, long studio living room, kitchen, shower bath. Ample closets, large porch. Utilities furnished. Adults. 3-6839.

NICE FURNISHED one bedroom apartment at 359 Hillside. Garage and all utilities furnished. Dial 3-6284. C. A. Bishop & Company.

FULLY FURNISHED Spanish-style apartment. Garage and storeroom. 914 Canyon Rd. $70.00. Dial 3-5665.

ONE ROOM housekeeping apartments and bath. Kitchenette. Stage Coach Motel. Phone 3-0917. 220 Water.

NICELY FURNISHED 4 room apartment with a heated garage. Walking distance of the Plaza. Phone 3-6214.

THREE ROOM apartment. Close to town, very reasonable. Call between 12 and 2 p. m. 326½ Hillside Ave.

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LOVELY FURNISHED efficiency apartment. Exclusive neighborhood, walking distance. 3-4926 after 6:15 week days.

NICELY FURNISHED one bedroom apartment. Across from Cordova Road shopping center. Dial 3-3908.

SMALL APARTMENT; furnished. Suitable for 1 person or employed couple. Reasonable. 947 Webber. Dial 3-0085.

FURNISHED APARTMENT, 2 lovely rooms, kitchen and bath. ½ block from Capitol. Utilities paid. Refrigeration. 3-6807.

UNFURNISHED — 2-bedroom apartment. Cerrillos Road. Stove and refrigerator furnished. $50. Dial 3-7013.

BEAUTIFUL APARTMENT—6 rooms, nicely furnished with piano. Close to Capitol. 143 Alameda. 3-4047.

OFFICE OR STUDIO—3 room unfurnished

THE NEW MEXICAN
Business Finance

Stanolind Advocates Blanco Gas Proration

A New Mexican Special

FORT WORTH, Tex., Dec. 15.—A hearing before the New Mexico oil conservation commission concerning the possible proration of gas from the Blanco (Mesaverde) pool will be held Dec. 18.

In connection with this hearing, C. F. Bedford, production superintendent for Stanolind Oil and Gas company's North Texas-New Mexico division, issued the following statement Saturday:

"A number of misleading statements have been made concerning the effect of the proposals to be made by Stanolind Oil and Gas company at the Blanco (Mesaverde) pool hearing Dec. 18. The hearing on gas proration is concerned with the Blanco pool only, and will not result in any orders affecting any other gas wells in New Mexico. A recent news report that our proposal calls for the testing of all gas wells in the state is false and completely without foundation.

'Held Equitable'

"The proration of gas in the Blanco pool will not adversely affect any operator or group of operators by limiting production from their wells," Bedford said.

"It is designed to give all Blanco operators and royalty owners the opportunity of sharing equitably in production from the pool."

In describing how the proration rule would work in Blanco, Bedford said, "Under the rules proposed by Stanolind, a purchaser of gas from the field would advise the New Mexico conservation commission in advance of its gas requirements from Blanco during the next proration period. The commission would then divide the total amount of gas required by all purchasers between all the connected wells in the field on an equitable basis."

Bedford emphasized that the rules would not prevent a purchaser from filling his gas requirements during peak demand periods. "This is the fair and democratic way of taking gas from the field," he said.

Balance Forecast

After discussing the manner in which proration would work, he went on to say, "without a rule of this kind there would be nothing to prevent repeated heavier withdrawals of gas being made each month from your neighbor's well than from your own well." The Stanolind proposal would require the balancing of such heavy gas withdrawals during a subsequent period, so that one well owner will not benefit in the long run at his neighbor's expense.

"The proration of oil has long been recognized in New Mexico and other states as being necessary to prevent waste by limiting production to market demand and to protect correlative rights of all interest owners. In most oil and gas producing states, including Texas and Oklahoma, gas is also prorated," Bedford said. "The recent rapid development of gas resources in the Blanco (Mesaverde) pool of the San Juan basin makes it imperative that production from wells in the pool be placed under the jurisdiction of the New Mexico conservation commission."

Plan to Proration Gas Production Draws Opposition

SANTA FE, Dec. 18 (AP)—The proposal of the Stanolind Oil and Gas Co. to institute prorationing of gas production in the Blanco field of San Juan County drew opposition from Southern Union Gas Co. and Indeps. [illegible] operators at a hearing here today.

The [illegible], if approved, would [illegible] on gas production in that area.

The [illegible] Rudy, signed [illegible] R. R. [illegible] secretary, [illegible] several [illegible] will be [illegible].

"We want to sit down with our attorneys and [illegible] engineer, and discuss this [illegible] order [illegible] also," he said.

Not Petroleum Sifted.

Opponents of the Stanolind petition, [illegible] declarations that prorationing would stifle development.

This is not the proper time, they contended, although they said they would not oppose prorationing if and when it is proved necessary at some future time.

At present, the opponents said the demand for gas is greater than the supply and therefore there is no waste to prevent.

These views were expressed by Van Thompson, exploration head of Southern Union Gas; George Lodtz of the Kingsley-Lodtz Co., Farmington attorney; [illegible] Richardson, [illegible] and [illegible] gas [illegible].

[illegible] equitable [illegible] them. He [illegible] [illegible] assure [illegible] this [illegible] present rate of drilling and present rate of the wells' deliverability continue.

Capacity Cited.

Said [illegible] plus present capacity of El Paso Natural Gas Co. pipelines in the field is 75 million cubic feet a day, and that of Southern Union Gas Co.'s lines as 45 million. At the present rate he said well completions in the Blanco field in four months should meet that capacity.

L. H. Bond of Stanolind presented the order suggested by the company. He said it included suggestions made by other operators in the pool.

Stanolind officials emphasized their proposal dealt only with the Blanco pool and did not involve other areas. But questioning of witnesses from the floor underlined concern of some operators that any procedure adopted for the Blanco field might spread to others.

Stanolind proposed in essence that the gas purchasers advise the commission in advance of their gas requirements from the Blanco field. The commission then would apportion the total gas requirements among all connected wells in the field.

...world champion boxers have been warned that the National Boxing Association wants fighting champions and if titles aren't defended, they'll be forfeited.

The bluntest warning went to Welterweight Champion Kid Gavilan of Cuba. Gavilan must sign a contract within 10 days to fight Charles Humez of France, the NBA said, or his title will be taken away.

Heavyweight Champion Jersey Joe Walcott and Light Heavyweight Champion Joey Maxim were reminded that they have only three more months in which to decide whom they will meet in title fights.

Eastern New Mexico starters who fouled out in the last quarter, held the visitors with 20 points.

Period scores:

ENMU	10	24	39	53
Geneva	16	23	47	52

More than a third of the province of Saskatchewan is forested.

company that is wisely managed will refuse to cover bad risks, or people who have a record of carelessness with fire. It separates the goats from the sheep.

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Editorial Page Forum

Proration of Gas in the Blanco Field

The Daily Times had planned to present as an editorial column forum arguments for and against proration of gas production in the Blanco field. The Stanolind Oil and Gas Co. has filed a petition asking proration. The Oil Conservation Commission of New Mexico will hold a hearing Dec. 18 on the petition.

Spokesmen for Stanolind, including the district engineer, have been invited to set forth in these columns the arguments supporting proration. Thus far no response has been forthcoming.

Since the date for the hearing is fast approaching the Times herewith presents the arguments against proration, and, in the absence of any response to our request for a statement of the position in favor of it, endorses for the immediate future the opposition to the proration proposal. It is our belief that proration of production is ultimately necessary as it applies to natural gas, or practically any other natural resource that can be exhausted or depleted uneconomically. We are now convinced this is not the time for proration of natural gas, however, in the San Juan basin.

Here are the main arguments advanced by opponents of proration:

1. The supply of gas on top of the ground here has not met present demands, therefore demanding a continuing program of intensive drilling. Proration would discourage additional drilling, especially by smaller operators.

2. Comparable line pressures maintained in the Blanco area rate wells automatically as close as they could be rated mechanically at this time. Line pressures at well heads are all comparable in the Blanco area.

3. With the engineering data [illegible] be [illegible] would be difficult, if possible at all, to set up adequate means of testing without wasting much gas to [illegible] as assertedly would be necessary to stabilize the [illegible].

4. Most land and royalty [illegible] accurate testing. from wells would be reduced [illegible] present incomes if proration were put into effect. [illegible] not drastically.

5. Most companies and independent operators will admit that, when gas deliverability [illegible] reaches and surpasses the demand, proration will be necessary and acceptable to all concerned. [illegible] opponents of prorations assert that time is five years hence.

6. The character of the Mesa Verde formation in this area, those who oppose proration contend, makes it impossible to damage the sand by overproducing wells. In the case of water drive, overproduction can damage a producing zone. Operators opposing proration declare there is no water drive in this section of the San Juan Basin.

7. It seems apparent that most operators in this area oppose proration at the present time.

In view of these considerations it seems the landowners and royalty holders should take action in the controversy. They can protect their interests by appearing or sending representatives to appear at the hearing in Santa Fe at 10 a.m. Dec. 18, at Mabry Hall, Capitol Building, Santa Fe.

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

SPECIAL HEARING

December 18, 1951

Case 330

- -

Case 330 will come before the Commission at 10 a. m., on this date at Mabry Hall, Santa Fe, New Mexico. This is concerned with Stanolind Oil and Gas Company's petition relating to the proration of natural gas in the Blanco (Mesaverde) gas pool, San Juan County, New Mexico and extension of the boundaries of the Blanco Pool.

BEFORE:

Hon. Governor Edwin L. Mechem, Chairman
Hon. Guy Shepard, Member
Hon. R. R. Spurrier, Member and Secretary

REGISTER:

R. S. Dewey
Humble Oil and Refining Company
Midland, Texas

Lewis H. Bond, Jr.
Stanolind Oil and Gas Company
Fort Worth, Texas

W. J. Nuss, Jr.
Stanolind Oil and Gas Company
Lubbock, Texas

J. K. Smith
Stanolind Oil and Gas Company
Fort Worth, Texas

O. Seth
Stanolind Oil and Gas Company
Fort Worth, Texas

Jason Kellahin
Oil Conservation Commission
Santa Fe, New Mexico

Jack M. Campbell
Campbellstein
Roswell, New Mexico

G. B. Jenkinson
Stanolind Oil Company
Tulsa, Oklahoma

P. P. Manion, Jr.
Stanolind Oil Company
Tulsa, Oklahoma

R. S. Christie
Amerada Petroleum Corporation
Tulsa, Oklahoma

Van Thompson
Southern Union Gas Company
Dallas, Texas

Quilman B. Davis
Southern Union Gas Company
Dallas, Texas

Joseph C. Gordon
Three States Natural Gas Company
Dallas, Texas

J. W. Cole, Jr.
Gulf Oil Corporation
Fort Worth, Texas

W. L. Barksdale
Dunn and Boreing
Denver, Colorado

C. C. Cragin
El Paso Natural Gas Company
El Paso, Texas

C. L. Perkins
El Paso Natural Gas Company
El Paso, Texas

Ben R. Howell
El Paso Natural Gas Company
El Paso, Texas

W. L. Taylor
El Paso Natural Gas Company
El Paso, Texas

W. T. Hollis
El Paso Natural Gas Company
El Paso, Texas

R. W. Harris
El Paso Natural Gas Company
El Paso, Texas

George D. Locke
Kingsley-Locke Oil Company

Joe V. Peacock
Phillips Petroleum Company

E. H. Foster
Phillips Petroleum Company

C. W. Binkley
Phillip Petroleum Company

Elvis A. Utz
Oil Conservation Commission
Santa Fe, New Mexico

I. R. Trujillo
Oil Conservation Commission
Santa Fe, New Mexico

R. S. Blymm
Oil Conservation Commission
Hobbs, New Mexico

Fred D. Gorham, Jr.
Pubco Development Company
Albuquerque, New Mexico

Aaron L. Calvin
Delhi
Dallas, Texas

R. G. Carlin
Delhi
Dallas, Texas

Alfred E. McLane
Delhi
Dallas, Texas

Clifford Smith
Delhi
Dallas, Texas

J. B. Howell
Delhi Oil Company
Farmington, New Mexico

Frank C. Barnes
Independent
Santa Fe, New Mexico

Robert E. Murphy
Magnolia Petroleum Company
Roswell, New Mexico

James L. Pasey
Magnolia Petroleum Company
Albuquerque, New Mexico.

S. P. Hannifin
Magnolia Petroleum Company
Albuquerque, New Mexico

E. R. Richardson
Lowry et al
Albuquerque, New Mexico

Dan W. Johnston
Albuquerque, New Mexico

T. H. McElvain
Independent
Santa Fe, New Mexico

J. R. Cob
Southern Union Gas Company
Santa Fe, New Mexico

- - - - -

MR. SPURRIER: The meeting will come to order. The first and only case which we will consider today is Case No. 330. Mr. Kellahin.

(Mr. Kellahin reads the notice of publication.)

MR. SMITH: My name is J. K. Smith. I represent Stanolind Oil and Gas. I would like to enter an appearance on behalf of Mr. Oliver Seth for the Stanolind Oil and Gas Company.

As stated in the notice of hearing, the purpose of the hearing is to consider the proration of gas in the Blanco Mesaverde Pool. Also, consideration of the enlargement of the limits of the Blanco Mesaverde Pool. As stated in the notice, our purpose is to make more definite and certain the provisions of Section 11 of Order R-799 as extended by R-110 which prescribed that wells should be by proration units in the field.

This hearing is a continuation of earlier hearings held in the past. One of October 28, 1948 which resulted in Order R-799 fixing the spacing and providing other rules and Order No. R-110 as a result of a hearing on October 23, 1951 which changed certain of the completion practices in the field. Also Order No. R-89 which changed certain of the field limits. I would like to emphasize that the hearing is to be confined to the Blanco Mesaverde Pool only. We are not asking for any tightening procedure of any gas wells in the State. It is just restricted as stated already to Blanco Mesaverde Pool. I would like also to point out that the purpose of the hearing is not to restrict the production which may be based upon the market demand, but merely that

demand be spread equally throughout the entire pool. I should like to offer additional testimony in addition to that given at the earlier hearing by calling Mr. Frank Nuss as our first witness. I don't believe Mr. Nuss has testified before and it will be necessary to call upon him and have him sworn as a witness.

FRANK NUSS,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. SMITH:

Q Will you state your name, please?

A W. F. Nuss, Jr.

Q Mr. Nuss, where are you employed?

A I am employed by Stanolind Gas and Oil in Lubbock.

Q How long have you been so employed?

A I have been with Stanolind slightly over six years.

Q Will you state your educational background?

A I have a degree in chemistry and physics and considerable extra training in petroleum engineer.

Q Where did you get your degree?

A Texas Christian University.

Q What degree?

A Bachelor of Arts, Chemistry.

Q Have you worked for any company besides Stanolind Oil and Gas?

A No.

Q The work that you have done with Stanolind Oil and Gas Company, what has it been?

A My work has been primarily reservoir engineer and evaluations.

Q Just a moment.

MR. SMITH: Would the Commission accept this witness's qualifications as an expert?

MR. SPURRIER: They will.

Q Mr. Nuss, in your capacity as reservoir engineer among the capacities that you have, I will ask if you have made certain studies with respect to the Blanco Mesaverde Pool?

A Yes, we have made fairly extensive study.

Q Will you state something with respect to the producing zone of the Blanco Mesaverde Pool?

A I have considerable history here. Gas Production in the Blanco Mesaverde Pool is obtained from the blanket sandstones of the Cliffhouse and Point Lookout formations of upper cretacious age which lying at a depth of between 3800' on the top of the Cliffhouse to approximately 5500' on the base of the Point Lookout formation. The two zones are separated by the Menefee formation which averages approximately 400' in thickness and which is not considered a major source of gas in the reservoir.

The pool is located in northeastern San Juan County, New Mexico, the gas production was originally discovered by Huntington Park No. 1 through the Goede, presently the Delhi No. 1 W. M. Mansfield which was originally a dual completion in the Pictured Cliffs and Mesaverde formation located in Section 29, 30 North, Range 9 West.

This well, which was originally completed in 1927, has supplied gas to the town of Aztec since 1929 and has a total circumlative production from the Mesaverde in excess of 1,000,000 MCF.

Q What has been the field production history of this particular pool?

A I would like to offer as our first exhibit a tabulation of the production history for the pool.

(Mark Exhibit No. 1 for identification.)

A (Continuing) The data I have compiled here is taken from a report made by Brokaw, McKee and Dixon from the beginning of production in the pool through 1948. The remainder of the data is taken from New Mexico Oil and Gas Engineering Company records.

It indicates a total cumulative production as of November 1, 1951 for the Blanco Mesaverde of 8,139,779 MCF of gas. Of that figure, 5,851,281 MCF have been producing during the first ten months of 1951. These figures indicate that the production during 1951 will represent something

better than 70% of the total cumulative production from the field.

Q What are the present area limits? Do you have any exhibits that show the area limits of the field?

A I have an exhibit which will be our No. 2.

(Marked Exhibit No. 2 for identification.)

A (Continuing) This map indicates the present outlines of the pool as established by the New Mexico Oil Conservation Commission under order R-89.

Q Is that the area outlined in red?

A It is the area outlined in red.

Q Will you explain the significance of that area outlined in green?

A The area outlined in green in this center portion of the field right directly north and east of it is the area which is included in our petition for the addition to the pool.

Q In other words, the area indicated in green is additional area limits that we are now asking?

A Yes. Gas saturation is found throughout this entire area even outside the field limits, but the commercial collection of gas wells is controlled by development of sufficient porosity and permeability in the formation to permit gas production at an economical rate. As of December 12, 1951, approximately 144 wells have been

completed in the pool. On that date there were 25 drilling rigs in operation in the field. The completion of wells in the area generally involves stimulation of the formation with large amounts of nitroglycerin, and in recent months the institution of rotary drilling with gas as a circulating medium has indicated excellent possibilities in the reduction of drilling and completion costs and improvement of completion procedures. In improving our completion techniques it is accepted by the majority of operators in the field that contamination of the formation through drilling well fluids when water base mud is used results in a decreased deliverability over other methods of completion.

Q State something with respect to characteristics of the producing formations.

A Geologically, the producing sandstones in the Mesaverde formation, the Cliffhouse and Point Lookout intervals, are blanket sandstones of upper cretacious age. They are composed of Marine deposited yellow to brown and cream colored sandstone beds with some sandy shale. Exhibit 3 electrical characteristics of the Mesaverde are indicated by the electric logs of the Stanolind Elliott "A" No. 1 which is representative of the producing horizon.

Q State briefly what the characteristics are.

A On this log I have marked the top of the Cliffhouse, the top of the Menefee and Point Lookout formations, the three

zones which comprised the Mesaverde Pool, also the top of the shale at the base. The electrical characteristics are thoroughly accurate.

(Marked Exhibit No. 3 for identification.)

Q What is your testimony with respect to the porosity and permeability in the producing area?

A On the basis of the core analysis data the average porosity for the Cliffhouse 10.6%, for the Point Lookout 9.7%. The permeability for the Cliffhouse .55 millardarcies and for the Point Lookout 1.4 millardarcies. We actually have very few cores, because of loss of circulation in the producing intervals.

Q What about your water saturation?

A I am inclined to believe that the water saturation as measured by core analysis are not representative of the formation especially taken with the water base mud.

Q What are the characteristics of the well with respect to any stabilization that may be required to get an accurate test?

A Well, the wells require a long stabilization period for this reason. We believe that deliverability tests against a uniform back pressure are much more representative and will result in a better test of the producing characteristics. The thickness of the two intervals is slightly over the area, the average thickness of the Cliffhouse and Point Lookout is approximately 60' each. There is no indication that geologic

structure has any direct influence on porosity and permeability.

Q That is the producing reservoir itself?

A That is in the reservoir.

(Marked Exhibit No. 4 for identification.)

Q I hand you what has been marked for identification as Exhibit No. 4 and ask you to state what it represents.

A This is a structural map contoured on the top of the Cliffhouse section in the center portion of the field that is the area in which Stanolind's chief acreage is located. Contour interval is on 50' basis. Contours indicate the top of the Cliffhouse pay section above sea level. Examination of the potentials of the wells in the area with respect to the structural location definitely indicates the structure has little effect on the capacity of the wells to produce. The sediments in the area with respect to this structure dip gently to the northeast from the outcropping formation approximately 50 miles to the southwest of this area of the field.

Q I asked you to state generally about the permeabilities in this area there and what they indicate with respect to the outcrop.

A The low permeability in the sands and also the apparent detrimental effect of fresh water on the formation indicates that the reservoir itself is isolated

from the outcrop and our production in the field will be by volumetric expansion of the gas. Cliffhouse and Point Lookout are open to a common well bore and a number of completions in the field.

Q What type of gas do we have out there, sweet gas?

A It is a sweet gas average gravity of approximately.67. We recover small volumes of condensate in the field. The production data at this time is insufficient to indicate a uniform average for the field. Original bottom hole pressure 1364 in the formation.

Q What about the bottom hole pressures in the field, what evidence do you have with this?

A Our best prodetermination of the original 1364 pounds per square inch shut in the formation.

Q What evidence do we have about the present bottom hole pressures that may be encountered?

A I don't have any recent bottom hole pressure data.

Q Any indication of any sharp decline?

A Not on the recent completions of all wells.

Q With respect to the purchasers of gas in that area what companies are purchasing gas at the present time?

A There are two pipe line supply systems. The El Paso and Southern Union Gas Company. Their lines and the production in the Blanco Pool extend over an area some 48 miles in length and 6 to 12 miles in width, a total of 270,000

acres.

Q That is the total acreage in the Blanco Mesaverde Pool at the present time?

A That includes the additional which we -

Q (Interrupting) The general area that we would like to add on?

A Yes. The developing in the field is on 320 acre spacing and gas production at the present time is against approximately 500 pounds line pressure in the El Paso line and the main Southern Union line, and approximately 300 pounds line pressure in the Southern Union La Plata line. That is the northwest portion of the field.

Q What about the additional development that may be going on in the field at the present time?

A The additional development in the area which we have colored green up there has resulted in commercial production from the Mesaverde zone and definitely indicates the desirability of an extension of the field limits for that area. I would like to offer this Exhibit.

(Marked Exhibit No. 5 for identification.)

Q I hand you Exhibit 5 and ask you to state what it purports to reflect.

A This Exhibit lists the recent completions in the area which is colored green on our Exhibit No. 2. It lists the lease well, number, location and zone in which the wells

are completed and the potential. There are nine wells which have been completed in that area, that is as of December 12. The potentials range from approximately 3300 MCF per day to 11,000 MCF per day. Each of the wells was completed in all three zones. That is the Cliffhouse, Menefee and Point Lookout formations are all open.

Q Specifically what sections will be included in the added area?

A The specific sections, they are all in Range 8 West. In Township 29 North there are Sections 1, 2, 3, 12 and 13. In Township 30 North, Sections 1, 2, 3, 10 through 15, 22 through 27, 34, 35, 36. In Township 31 North, Sections 25 through 36. During October of this year 80 wells which were completed and producing in the field made a total of 1,466,849 MCF. That is a rate of 47,280 MCF per day or 591 per well MCF, per well per day.

Q How many wells completed in the field as of recent date?

A Latest date December 1, 144 wells completed as of that date. These 144 completions indicate that the field average potential average per well will be approximately 2,550 MCF per day.

Q How many wells were running during September, October, November continuously in that area?

A During that period approximately 25 rigs were running

average during the period they were completing 14 wells per month or approximately 168 wells per year. On the basis of the pipe line capacities which have been supplied by the purchasers we have an indication of 70,000,000 cubic feet per day for El Paso Natural Gas Company and 45,000,000 cubic feet for Southern Union Gas Company.

Q Have you worked out the average deliverability of the wells and are you able to show how the capacity is being approached?

A Considering that the average deliverability of the wells during October of this year will represent the additional wells which will be completed, the capacity of 115,000,000 cubic feet per day can be supplied by 195 producing wells. At the present time, 144 wells are completed leaving 51 wells only to be drilled before the pipe line capacity from the field will be met. At the present rate of completion of wells this will require approximately four months improvement in completion techniques which will increase the well deliverability.

Q Is there a possibility of any acceleration of that date due to improved completion techniques?

A There is a definite possibility that improvement will reduce the time required to meet the pipe line capacities.

Q That will be due to increased deliverability of the wells completed?

A That's right. Under the presently indicated productive acreage for the field approximately 846 wells will be needed for complete development. At the present rate of completion, the field will be completely developed within 4.3 years. These factors indicate that continued development of the field will result in producing capacity in excess of transmission capacity during the coming year and proration of gas will be necessary to assure rateable takes among the wells in the field.

MR. SMITH: In your opinion, you consider that in order to extend into this at this particular time, it is necessary that we attempt some sort of proration. I have no further questions of this witness.

MR. SPURRIER: Does anyone else have a question of this witness?

MR. LOCKE: I would like to ask one question.

Q (By MR. LOCKE) In what State do they use the method of proration suggested by you?

A Sir?

Q What State uses the method of proration suggested by you?

A I am sure it is used in Texas.

Q You suggested a method of proration a moment ago in your testimony. I asked you to name a State in which that

system of proration is being enforced.

A I am sorry sir, I haven't suggested a method of proration. I believe the method that we are proposing is used in Texas.

MR. LOCKE: That is all.

MR. SPURRIER: Mr. Davis.

MR. DAVIS: I would like to ask you, Mr. Nuss, in making a statement here a minute ago about the fact that wells now in progress within four months, I believe you said, would satisfy the market requirements of the pipe line companies in the Blanco Mesaverde Pool. Do you have any information as to the market requirements of the pipe line company for the future in making that statement?

A I have only -

MR. DAVIS: (Interrupting) What do you base it on?

MR. SMITH: I don't believe he testified with respect to market demand. That is to pipe line capacity.

MR. DAVIS: That is with respect to pipe lines now implaced there.

MR. SMITH: That is right.

MR. BARNES: You spoke about the deliverability of the well. What is the deliverability based on, is that actual line input or based on initial potential?

A The deliverability which I have used in the estimates is based on the actual production on wells which were

producing during October of this year.

Q (By MR. BARNES) That is based on actual line input for the month of October?

A That is right.

Q You are projecting that same production when you say that you believe the wells will very shortly be producing more than the pipe line capacity?

A The same average deliverability in the pipe line.

Q Do you have a figure here as to what the absolute total pipe line capacity is at the present time?

A The only figure that I have is the figure which has been supplied to my company by the pipe line outlets, that is the two which I gave previously. I would like to have confirmation of those if we can get it.

Q You based your figure on a statement there and you don't actually have any accurate data to indicate what the actual pipe line capacity is at this time or what it is likely to be?

A I used the best figures which we were able to get for the capacity.

MR. SMITH: You obtained those figures from the purchasing companies direct, did you not?

A Yes, sir.

MR. SMITH: That is all.

MR. BARNES: That is all.

Q (By MR. FOSTER) Mr. Nuss, you used the term deliverability, in your thinking is that synonymous with potential?

A No, sir. The deliverability which I am using in this case I am thinking of actual production into a pipe line.

Q Against some assumed pipe line pressure?

A Yes, sir, I believe it has been running approximately 500 pounds in most of the field.

Q In your thinking, how do you use the term potential?

A The potentials which have been reported are supposedly open flow potential that is against atmospheric pressure.

Q Is that at the sandface or at the top of the pipe in your definition of the term?

A I believe that the reported potentials would be with atmospheric pressure at the surface.

Q At the surface. What size pipe do you have in mind there in determining those potentials?

A I haven't used potentials now in any of my calculations.

Q I understand.

A As far as I know the size of the pipe varies somewhat over the field. We are not recommending the potential.

Q What is the variation in pipe size?

A I don't have any figures on that.

Q You just know that it does vary?

A Yes.

Q Some speculation as to what the variation might be in

pipe size?

A I don't have any direct information.

Q What size pipe do you use in your well?

A I believe we are setting five and a half.

Q Do you know of any smaller size used by other companies?

A I don't have any direct knowledge of that, no, sir.

Q Do you know of a larger size used by other companies?

A I don't have any direct knowledge on either of those.

Q You don't apply the use of any friction factors in determining your wellhead potential?

A Would you state that again, please?

Q Do you use any friction factors in determining your wellhead potential?

MR. SMITH: I don't believe Mr. Nuss's testimony covered that on direct examination.

MR. FOSTER: Are you objecting to it?

MR. SMITH: No, I am not objecting. Is this direct examination here. It is not part of the cross-examination.

MR. FOSTER: That might be a matter of opinion. We are interested, of course, he testified about gas proration. We don't have any rock in the bucket at this time but I can see on a system of gas proration and what you apply here in this field, you might well apply in some other field where we are interested. I just simply want, of course, if Mr. Smith doesn't want to answer.

MR. SMITH: I have no objection to his answering the question.

Q (By MR. FOSTER) Would you answer?

A Would you state your question again?

Q Do you use any friction factors in determining the wellhead potential?

A When we are calculating open flow potential from back pressure test for our own wells we normally use the friction factor in calculating that.

Q Do you calculate it back to the sand face?

A That's right, yes, sir.

Q These open flow potentials that you are talking about are really calculated as the potential of the well at the sand face?

A Well now, I am not familiar with the way most of those were calculated. We have taken the reported potentials for most of the operators. I know how mine were calculated.

Q You haven't suggested the adoption of any proration formula for prorating gas in the field, you yourself?

A Myself, I have not.

Q Some other witness will do that, I assume?

A Yes.

MR. FOSTER: That is all.

Q (By MR. SHEPARD) Have you had any trouble in obtaining connections?

A Stanolind hasn't, no, sir.

Q (By MR. KELLAHIN) In your testimony as to the producing formation, I recall that you said that the formation is a yellow or brown sand and some sandy shale.

A Yes, sir.

Q In connection with that you testified as to the porosity and permeability of that formation on the basis of core analysis?

A Yes.

Q Could you say how many of the core analysis were available to you?

A I believe there were a total of six core analysis.

Q Would you say there was any variation over the field in the porosity and permeability?

A As I recall there was not a large variation.

Q There would be some?

A There was some, certainly.

Q What effect, in your opinion, would the variation in porosity and permeability have on the correlative rights, for example the land that overlay the area of less permeability?

A I wouldn't, if you could state that a little different. I don't understand what you mean by the question.

Q The question I have in mind is this. What effect would the institution of the temporary proration system

which Stanolind has suggested have on the protection of correlative rights?

A In other words, what effect, let me see if I understand you, what effect would the use of the proration formula that we are proposing have on correlative rights.

Q Yes.

A I believe the formula we are proposing will represent a reasonable protection of the correlative rights. In other words, I feel that the variation of porosity and permeability and the formula which we are proposing are, you might say, in accordance with each other.

Q In other words, you don't think there is sufficient variation that it would have only material fact?

A I think they would about cancel each other out.

MR. FOSTER: What is the formula that you propose?

MR. SMITH: That formula will be covered by a different witness.

MR. FOSTER: Alright.

Q (By MR. DAVIS) I believe you testified that within perhaps a year and a half there would be an excess of gas in the Blanco field?

A Within, if the present drilling rate continues and assuming that the average deliverability of the wells which are producing is representative, we should have an excess capacity during the coming year.

Q Did you have any information as to proposed expansion of the pipe line companies, pipe lines up there of their additional need for gas in the Blanco area in making that determination?

A I was not able to get any of the information.

Q In other words, the idea that there would be an excess of gas in a year is purely a hypothetical case without taking into consideration the real thing as to what the needs will be for gas of the Blanco field and the proposed pipe line addition?

A The data which I have given is based on the present capacity as best I have -

Q (Interrupting) Without any expansion?

A Without any expansion if such is in the wind.

MR. DAVIS: That is all.

A VOICE: Are you familiar with the testimony previously given the Federal Power Commission with reference to the need for additional pipe line in the basin?

A No, sir, I have not had a chance to read you all of that.

Q (By MR. BARNES) I would like to ask you two more questions. You used the word deliverability several times. Isn't it true that the bulk of the drilling in that area has taken place in the last year or year and a half?

A I believe that is right.

Q Much larger proportion of the wells completed in the last six months or previous year?

A I don't have any accurate figures on that. I know that production this year is greater than it has been in the past. It is shooting up rapidly.

Q Wouldn't it be true that a lot of deliverabilities on wells that have only been on the pipe line a short time, if in fact only too short a time to know what their actual deliverability will be?

A That is possibly true. I might point out that we expect our wells to clean up an increased deliverability as they continue to produce.

Q Do you have any concrete examples of that? Any specific wells you can mention that have done that?

A I don't have any specific examples. I believe that has occurred in one of our wells at least.

Q I would like to ask you one other question. You said there had been no decline in production of recent completions. Do you have any evidence of any decline in any completions up there at all? Let's take the original Mansfield's well. Has there been any decline in the production of that well since it was -

A (Interrupting) I don't believe I made that statement to begin with. I don't have any figure on decline of any single completion.

Q I may have misunderstood. I thought you stated there had been no decline in recent completions.

A I didn't state that, no, sir.

Q Well, let it go. I think if you will go back through the testimony, you did make that statement.

MR. SMITH: You mean decline in the number of completions per month?

MR. BARNES: I said there had been no decline in production in recent completions. Just a general statement. In any of the older wells. I don't have any concerning the decline of any single completion. I will let the record stand on that.

MR. BARNES: That is all.

MR. SPURRIER: Any further questions of this witness?

By MR. WHITE:

Q Has the bottom hole pressure decreased in any of the wells?

A I don't have any recent bottom hole pressures. Most of the production has been taken from the field during this year. We have noted practically no decline in bottom hole pressures of our own completions.

Q Of the 80 wells you speak of, how many are owned or operated by Stanolind?

A I believe we had two or possibly three on production during October.

MR. SPURRIER: What sort of test was this original potential that you took on these wells?

A We took back pressure tests on our own wells, particularly on Stanolind Elliott. I am not familiar with all the procedures used by the other operators in reporting their potential tests.

MR. SHEPARD: How many different operators are there in the Blanco?

A I don't have that figure. Let me see. Some 15 I think, 15 to 20.

Q Are there anymore questions, Mr. Barnes?

MR. BARNES: I don't want to beat this to death, but I would like to ask one more question.

Q (By MR. BARNES) This is an opinion question. In your opinion, do you believe that fixed core analysis in a field 48 miles long and 20 miles wide is sufficient to evaluate the decline of the potential of the entire area? Do you think you have a sufficient spread?

A As far as I am concerned, I don't think we do. But I haven't actually used the core analysis. But a preliminary estimate of the porosity and permeability in the formation -

Q (Interrupting) You don't think that is sufficient to compile any final figure on?

A I would like to have more -

MR. WHITE: (Interrupting) You said very few were taken

and I think you later stated 8 to 10. Can you point out on the map where the 10 cores were taken?

A No, sir. I don't have those locations in mind.

Q You don't know whether they were taken in the same area or diversified through the field?

A No, I don't. I think most of them were through the center portion of the field.

MR. GORHAM: I would like to ask, relative to interlocking reservoirs in the Blanco area, when wells have been shut down to the surface with an adjacent well's produce, has there been any decrease showing any inter-locking capacity?

A So far as I know there have been no tests of that nature. It would require considerable amount of production from an offset well in a field of this size before any pressure would be noted on a shut-in well. You are going to have to produce a lot of gas from the rese voir in order to pull the pressure down any.

MR. SPURRIER: You represent Southern Union Gas Company? I wish you would give your name and who you represent.

Q You testified that during the month of October, 80 wells produced an average of 591,000 feet a day. And it was your opinion that the wells would continue to produce at that rate, is that right?

A I testified that I was assuming that those wells were

representative of the additional completions which we will be making.

Q Are you aware that during the month of October a large majority of the wells had not produced into the line long enough to have stabilized in their flow and that it takes several months for any of those wells to become stabilized into the pipe line?

A That is possible.

MR. SPURRIER: Any one else?

MR. LOCKE: Do you know how many wells are actually producing into the line in October?

A From the figures which I obtained from the New Mexico Oil and Gas Engineering Committee, there were 80.

Q How many of those did Southern Union have?

A I don't know.

Q How many were producing into the El Paso pipe line?

A I don't have that location.

Q Do you know the location of the wells producing into the lines?

A I don't have it with me. It is reported to New Mexico Engineering Committee. That is where I got the information.

MR. WHITE: When was the first well drilled in this field?

A I believe the first well was completed in 1927 or 1928. That was the well which is now the Delhi No. 1,

with a Mansfield.

Q Can you give us the number of wells that were drilled, say, within the first ten years, and how many in the last few years, say, within the last year?

A I don't have that information with me, sir. Most of the wells I believe have been drilled since the first of 1948.

Q You say most of the wells. How many would you say?

A I think there was one well producing until 1948.

Q Then in approximately 79 of the wells have been drilled since 1948?

A That is right.

MR. SMITH: Do you know how long the 25 rigs have been running out there?

A The only figures I checked in that respect were for the last three or four months of this year.

MR. UTZ: Mr. Nuss, getting back to your back pressure tests. How many wells did you back pressure test, can you give me that figure?

A I don't have it with me. I know that we have taken back pressure tests on two of the wells.

Q Were they four point tests?

A Yes, sir, four point tests.

Q You are able to get a reasonable four point test on them?

A I wasn't entirely satisfied with it, no, sir. They take a long time to stabilize.

MR. SPURRIER: Any one else?

MR. SHEPARD: This first well that was drilled, has there been any recent test on it?

A If there has been it hasn't been in a form where I could find it.

MR. SPURRIER: Mr. Barnes, will give you just one more chance if you want it.

MR. BARNES: I don't want another chance, I wasn't going to ask a question merely as a matter of record. I checked the State Oil Commission records on the basis of the actual records turned into them, I found at the end of October, 92 wells were on the line in the Blanco field of which 48 were Southern Union, and 44 were El Paso. I just want to enter that in opposition to a previous figure.

MR. SPURRIER: Thank you. Any one else? The witness is excused.

(Witness excused.)

LEWIS BOND,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. SMITH:

MR. SMITH: I believe he has testified before and you have accepted his qualifications.

MR. SPURRIER: That is right.

Q (By MR. SMITH) State your name.

A Lewis Bond.

Q By whom are you employed?

A Stanolind Oil and Gas Company.

Q Mr. Bond, how many purchasers of gas are there in the Blanco Mesaverde Pool?

A Two. The Southern Union and El Paso Companies.

Q Do you have any exhibits that show the ultimate market for gas purchased by the two companies?

A Yes, I do.

(Marked Exhibit No. 7 for identification.)

Q Will you please state what those markets are?

A This map shows major gas pipe lines in the United States. It is of interest in this regard to Blanco area since it shows the market served by the Southern Union and El Paso lines. The Southern line serves towns in New Mexico such as Santa Fe, Albuquerque, Los Alamos, and Durango in Colorado. The El Paso line serves markets chiefly in Arizona and connect with the Pacific Gas and Electric Company line which I believe ultimately transports that gas to San Francisco.

Q Do you have an exhibit showing the location of the gathering lines of El Paso and Southern Union in the Blanco Mesaverde Pool?

A Yes, sir.

(Marked Exhibit No. 8 for identification.)

Q I note that you have different colored lines in there. Will you please explain which colors are which companies lines?

A First I would like to state that the orange border indicates the present boundaries of the Blanco Mesaverde Pool. The lines colored in red indicate pipe lines operated by El Paso Natural Gas Company. The lines indicated in green are operated by Southern Union Gas Company. This area is the Fulcher-Kutz Pool which produces across from the Pictured Cliffs and is not involved in this hearing. I would like to state that the information which I have on the Southern Union line, I believe is current as of last March 1951, and the El Paso lines as of October. So I feel sure that there are numerous other lines which have been completed since these transitions were prepared. The dotted lines on this map indicate proposed lines, many of which I am sure are in place at the present time. I would like to point out further that the old La Plata area is served by the Southern Union Company. The Largo area to the south served by the El Paso Company. And in the central portion of the pool which is the area where the Blanco Pool was first discovered is served by both lines. I have colored in that area served by both lines, acreage which is connected to each line. The blue color represents acreage connected to

El Paso lines and the yellow to the Southern Union lines. I would like to explain that this legend which indicates that yellow is dedicated to Southern and blue acreage dedicated to El Paso's line is not intended to imply that is the only acreage so dedicated. I have merely colored it in, the central portion, to illustrate a point. My point is this. You will note from the colored blocks that acreage served by the El Paso line is in more or less of a checkerboard pattern with acreage served by Southern Union. In other words, there are offsetting tracts served by both lines in that area. I feel sure that that condition exists in other parts of the field and will exist in a considerably larger portion. Since the acreage served by the two lines is in close conjunction, it appears to me that unless the withdrawals from both lines are approximately the same percentage as deliverability of the wells that they are connected to, that some inequities will result to the royalty owners and lease owners of the acreage involved.

Q We have proposed certain rules with respect to that feature. Would you like to explain the proposed rules that we have?

A Yes.

Q That we have suggested to the Commission.

A Yes, sir. I have several copies of these and perhaps the Commission would like to look them over at the same time.

I would like to state before reviewing the rules themselves that we have discussed the rules with other operators in the Pool and have included suggestions made by various operators. The proportion of the rules commenced with Paragraph A. I will begin discussing the rules. On the first page, we have merely prepared a proposed form of order for the convenience of the Commission in considering this matter. I would like to point out two corrections which may be made on some of the copies which have been circulated, and not on others. Where reference is made to Order 799, the reference should be to Order No. R-110, which is the most recent order promulgating rule for the Blanco Mesaverde Pool. Going to Paragraph A, on Page 2, where the actual mechanics of prorating gas are outlined, that paragraph provides that the production from wells in the Blanco Mesaverde is to be determined by nominations which are submitted by the purchasers of gas in the pool, on yearly basis. It also provides that the Commission may consider previous over and under productions in arriving at the actual allowable from the nominations submitted. That provision is to enable the Commission to add previous over production to the nominations or subtract previous under production in order that the purchasers may produce the amount of gas which they require and still make up previous over or

under production.

This paragraph also provides that the purchasers may submit amended nominations at such time as it becomes obvious that their nominations have not adequately reflected their market for gas. In Paragraph B there is a provision for allocating the allowable established by the Commission for the first year, or rather I should say from the effective date of this order to January 1953, on the basis of the open flow potential tests which have been taken on the wells.

In Paragraph C, it is provided that after January 1, 1953 gas in the pool shall be allocated on the basis of acreage times deliverability. In other words, each well will get a share of the total pools allowable which is in proportion to the product of the acreage assigned that well and the deliverability of that well to the summation of the product of these factors as to all the wells in the pool. It has an additional paragraph, or rather an additional feature which provides that low capacity wells which are recognized by the operator as not being able to produce their assign allowable may be assigned a lesser allowable at that operators request. It also provides that the Commission may set a minimum allowable which may be produced by any well whose allowable is calculated by the formula that we have outlined, is considered to be

unreasonably low. We haven't made any suggestion as to that minimum figure since we believe that actual schedules probably should be computed before enough information will be available to recognize what a fair figure should be.

Paragraph D defined deliverability as indicated capacity of the wells to produce against a stipulated pressure as determined by tests to be approved by the Commission. It is our thought that before January 1, 1953, at which time the deliverability feature of the rules would become effective, if the rules were approved, that tests can be taken and studies can be given to the actual manner of conducting deliverability tests. We thought that perhaps if sufficient data was available at the present time to actually outline a deliverability test which would be satisfactory at this time.

Paragraph E provides for the taking of deliverability tests on all wells during the period to be set by the Commission and during the same period each year thereafter.

Paragraph F provides for a balancing date for the purpose of computing and of balancing over and under production. It also establishes balancing periods of twelve months duration. The periods are to begin at 7 o'clock a. m., January 1 of each year and end as of the same time each following year.

Paragraph G provides that wells in the Blanco Pool

may be produced in excess of their assigned allowable provided that any well which is over produced as of a balancing day in which it was over produced on the previous balancing date, must be shut in until the over production is made up.

Paragraph H provides for the carrying forward of the under production from one balancing period to the next. It also has a provision that cumulatively under produced on two successive balancing periods, shall have the under production for the second previous balancing period cancelled. Another provision on Paragraph H is that wells which are cumulatively under produced on two successive balancing dates due to lack of ability to produce will not have an allowable assigned greater than their average production during the preceding balancing period.

Paragraph I provides for the issuance of a proration schedule by the Commission by January 20th of each year showing the allowable assigned each well for the year, and during subsequent years the schedule would also show the over production charged against each well or the under production which is credited to that well for allowable purposes.

Paragraph J merely provides for suitable reports to be submitted to the Commission to carry out its duties in respect to this suggested order.

Q Mr. Bond, in your opinion, as an engineer, from the standpoint of protection against withdrawals from one tract to another, in view of this situation as exemplified by Stanolind's Exhibit 8, do you consider the rules to afford the best possible protection against such inequitable withdrawals?

A I believe the rules as designed will protect equities, protect operators against inequitable withdrawals, I should say.

Q Do you have any information on the respective market demand of this company's purchasing in the Blanco Mesaverde Pool?

A No, sir, I have not.

MR. SMITH: I have no further questions.

MR. SPURRIER: Does anyone else have a question?

MR. LOCKE: Do you have any communitization between any of the areas set out in the two different colors?

A I have no interference test or direct knowledge such as would be acquired.

MR. LOCKE: Do you have any interference tests?

A I think that fact that the Commission has recognized that area as one pool and has found that 320 acres units are a desirable development pattern would indicate that there will be communitization between wells located on those tracts.

Q (By MR. LOCKE) But the Commission has not so found that there is communication has it?

A Not directly. I believe their establishment of proration units would carry that imprint.

Q But all you have is conjecture but there might be at some future date communitization?

A Yes, I can't definitely state there is at this time. In my opinion there certainly will be.

Q You say certain operators suggested these rules. Name the operators who participated in these suggestions.

A Delhi Oil Corporation, Southern Union, El Paso, Stanolind, and I believe have all made certain suggestions to the rules.

Q None of the interested operators participated then?

A I don't know what your definition is.

Q I mean a smaller company, not one of the major.

A If the companies I named are major, no, sir, they did not.

MR. DAVIS: Just in answering Mr. Locke's question, I didn't understand you, I don't understand. Do you mean that Southern Union has recommended -

A (Interrupting) No, sir, I don't mean to say that the companies I named are advocating the rules that I have presented. I do mean that they have suggested if rules are issued, certain desirable features to be included.

Q (By MR. DAVIS) Has Southern Union ever suggested or recommended that proration rules be pool-wide?

A No, sir, not to my knowledge.

Q Your proration order is predicated upon prevention of waste and production of correlative rights, is it not?

A Yes, sir.

Q You are familiar with the definition in the Oil Conservation Act of what constitutes waste?

A More or less, yes.

Q Do you know of any present waste in the Blanco La Plata Mesaverde Pool at the present time?

A No, sir, I don't know of any waste.

Q In other words, is it true that the proposed proration order is something for future, might be five years it might be two years and then again it might never happen?

A I can't agree with that statement entirely, Mr. Davis. You mentioned that our order was predicated on waste and protection of correlative rights.

Q And, or?

A And, or. Our rules as proposed, actually would tend to protect correlative rights at the present time.

Q Do you have any evidence that correlative rights are not being protected?

A In answer to that, I will just say this. At the present time, if a well is shut-in for any reason such as mechanical

difficulties or perhaps a well is frozen up during cold weather, which I understand is not unusual in that area, under the present conditions that would result in a loss of production to the operator of that well. If our rules were in effect, that well would accumulate under production which could be produced at a later time and the operator and royalty owner holding interest under that tract would be protected. Correlative rights, I think, will be protected even more in the future since I believe that the supply of gas in this area is going to exceed the capacity of the lines. And at such time, I think there will definitely be a need for an equitable method of allocating the gas to the various wells in the pool.

Q You referred to in the future. That would mean, that is rather indefinite as to what the future would hold.

A Well, based as Mr. Nuss testified, based on the present capacities, it appears that that situation will be reached during the next year.

Q But Mr. Nuss didn't have full and complete information as to pipe line additions and, or the quantities of gas expected to be withdrawn from that area during the next few years.

A No, sir, he did not.

Q Let me ask you one other question. You say here that protection of correlative rights and protection is not

contemplated by the statutes. That proration will be put into effect when there is an actual waste or correlative rights.

A (Interrupting) I think that is a legal question.

MR. SMITH: I think he is asking him a legal question. I don't think the witness is qualified to answer it.

MR. SPURRIER: You present that as an objection?

MR. SMITH: I think it is an objection and it is argumentative and it is within the sphere of the witness.

MR. SPURRIER: Objection sustained.

MR. THOMPSON: Now asking, Van Thompson, Southern Union.

Q (By MR. THOMPSON) Mr. Nuss testified that based on the core analysis, the average permeability was varied between .55 and 1.4, which is considerably, very very low for permeability. I would like to ask you in your opinion, do you think one well with a permeability like that will drain more than 320 acres?

A My opinion is that it will, yes.

Q In what length of time do you think it will take to do it?

A I couldn't make an offhand estimate.

Q (By MR. DAVIS) Do you know of any wells there that have not been connected when requested to do so?

A No, sir, I don't.

MR. SPURRIER: Anyone else have a question?

MR. BARNES: I would like to bring out a point.

Q (By MR. BARNES) Do you know at the present time of any single well in northwestern New Mexico, any single well standing by, unable to connect to a line because there is an over production of gas and over abundance of gas in the area and they can't put it on the line?

A No, I don't have any knowledge of any well like that.

Q I would like to point out, you have made the statement here and you also have it in your proposed order, that each operator shall have a right over like periods to make up any deficiency in his rateable share. Under H, it states here, any well which is under produced has, of a balancing date, may carry forward such under production as allowable credit to be produced during the next balancing period. I would like to point out that the production of the wells up there at the present time are based on two factors. One is the reservoir condition under the individual wells which of course, is an index of its permeability and porosity and the ability of the well to drain a particular area effectively. The second factor is the ability of that particular well to button the pipe line pressures and there are a great many wells up there in their deliverability which can't deliver more than about two to three hundred thousand cubic feet of gas, and some

wells will deliver three or four million. Those are just general figures, anyone can check and find them pretty nearly correct. I don't believe wells shut in over a period of time and not allowed to make the gas over a period, could make the gas up.

MR. SMITH: Is this a question or are you offering testimony? If it is, I would like -

Q Do you believe under that situation that the wells could ever make up that gas?

A Some wells, Mr. Barnes, due to their limited capacity obviously would never be able to make up under production which was due to allowable assigned in excess of their capacity. Other wells which might have mechanical troubles, failed to produce for other reasons, could make up such under production. Perhaps a well could be worked over in some fashion and its producing ability increased in that case it could make up previous under production.

MR. SPURRIER: Any further questions?

MR. WHITE: Do you know how many wells have been brought in within the last year?

A No, sir, I think Mr. Nuss had some figures on that but I don't recall exactly what they were.

MR. SPURRIER: Do you want Mr. Nuss to answer the question?

MR. SMITH: No, he testified that there were 79 brought

in since 1948 as I recall.

MR. SETH: We will get the figures for you.

MR. SMITH: My recollection was that he testified there was something like 144 wells completed out there.

MR. SPURRIER: In the interest of time and for the record, does anyone know how many wells have been completed in the past year? I presume you mean the first months of 1951.

MR. SMITH: I don't believe we have any data on the annual, what wells were completed during this current year. We only have information on the total number of completions out in the field.

MR. SPURRIER: Does anyone have any further questions?

MR. FOSTER: May I ask one more question?

MR. SPURRIER: Judge Foster.

Q (By MR. FOSTER) Perhaps I am way behind on this thing. There has been some other hearings had and I don't know what the record reflects. But apparently, Mr. Bond, you now have in mind some means of implementing the general rules you have set out here, or you have already placed those means of implementation in the record. Such as, how are you going to determine the back pressure and slope off your curb and so forth.

A Judge Foster, as I mentioned, perhaps I didn't discuss it fully a while ago. We haven't recommended a back pressure

for a deliverability test. It is our thought that an actual deliverability test against a line pressure to be determined would be the most accurate method of comparing the producing capacity of the well. In an actual deliverability test like that, of course, there will be no line or slope or any computation to it. It will be an actual test. The reason that we did not recommend the mechanics of taking the test at this time was that we wanted to have time to make more tests in the field and give that more study before recommending tests to the Commission.

Q Well now, you have in mind some back pressure on which your deliverability is to be determined?

A Well, offhand it was our thought that a back pressure in the neighborhood of the actual working pressures of the lines would be most desirable.

Q Do you have in mind a constant or variable back pressure?

A Constant for a certain length of time at least. It might be necessary in the future years as the producing ability of the wells decreases to establish another back pressure that the wells do produce against.

Q Do you mean that you have in mind 500 pounds for one pipe line and 300 pounds for another?

A No, sir, I didn't mean that.

Q At this time do you have any evidence that the deliverability or whatever you have in mind on that, is proportional to the gas reserve per acreage?

A I think that our formula which is acreage times deliverability has a correlation with reservation, yes, sir.

Q Of course, that assumes a lot of other facts does it not?

A Yes, that is right.

Q Those facts that you are assuming in making that answer are those matters of records in hearings that have been had heretofore?

A Well, I would say this, Judge Foster, I can't think of any pool offhand that in my mind deliverability, I am speaking of gas pools deliverability and acreage, wouldn't have some relation to the reserve.

Q Well proportionately only with respect to the manner in which it might determine deliverability?

A I would say, I would state further that I believe the testimony which Mr. Nuss has put in includes some of the factors that would have to be considered. I believe it is part of the record, yes.

Q What flow period do you have in mind in determining the deliverability of the wells?

A I haven't any flow period in mind at the present time.

Q Well that is necessary isn't it?

A Yes, but as I explained, it is my thought that will be considered by the Commission at a later date.

Q Don't you have in mind something that you might suggest to the Commission?

A No, sir, I do not.

Q You do not.

MR. SMITH: Mr. Bond, it will not be a factor until after 1953, isn't that correct?

A That is correct.

Q (By MR. FOSTER) What you are saying is that depending upon what the reservoir condition may be beginning in 1953 might determine what you suggest as a flow period?

A That might have something to do with it, yes.

Q Up until 1953, your proposition is just prorated on a straight potential basis?

A Yes, sir.

Q That is not a matter of sound engineering, but just one of expediency, isn't it?

A I didn't understand the question.

Q You are suggesting for prorating up until January 1, 1953, on the basis of just potential, isn't any sound engineering question, it is just a matter of expediency?

A Well, I don't think that it is unsound engineering, Judge Foster. If we had deliverability tests on all the

wells at this time it would be my recommendation that we institute our acreage times deliverability formula at the beginning of these rules.

Q I am talking about your suggestion just to prorate on a potential period for a period of one year.

A Yes.

Q I am saying that suggestion rests more on a matter of expediency than it does on sound engineering principles.

MR. SMITH: I am inclined to think that the question is argumentative, or have him amplify what he means by expediency.

Q All I am saying is, and he told me that it was his desire to prorate gas somewhat on the basis of reservation in place. If you will pardon me for doing a little Dr. Jekyll and Mr. Hyde, turning from lawyer and engineer, I know you can't do that on a basis of straight potential. That is all I am getting at. It is a matter of expediency for the first year that you suggest that you prorate it on a basis of straight potential rather than on the basis of any sound engineering principles.

MR. SMITH: I see your point.

A If you understand the question, I don't think that prorating on the basis of potential tests is unsound, especially for the period of time required to obtain better tests. I don't think that any drastic, let me put

it this way, I don't think inequities will occur as a result of that, Judge Foster.

Q You mean over a years period, period of one year?

A Over a years period at least.

Q Over a longer period, you think it would?

A I would prefer acreage times deliverability.

Q Because that is better than straight potential?

A Yes, sir.

Q That is what I am saying. So really the basis of your suggestion is simply one of expediency rather than sound engineering principles?

A I can't go along with you entirely on the statement, no, sir.

MR. SMITH: Based on present information from the field out there, is it not - wouldn't it not be considered sound engineering to use a potential test until such information or data is available upon which your deliverability times acreage can be determined?

A I believe it is as sound a method as is available to us.

Q (By MR. FOSTER) You mean working with what you got, that is the best you can do?

A Yes.

Q That is a matter of expediency.

MR. FOSTER: That is all. One other question with the

acreage unit you have in mind, some maximum acreage unit to be used in the field, don't you?

A Yes, sir, we didn't put any figures in I think that would be at the discretion of the Commission. I don't believe they would allow acreage greatly in excess of the 320 acre drilling units to be applied for allowable credit.

Q (By MR. FOSTER) When it comes around your time to suggest, you mean you are going to suggest 320 acres as a maximum unit?

A No, sir, I didn't say that.

Q Well, do you say that?

A No, I say that would be a matter for the Commission.

Q For the Commission to make up its mind, based on the testimony, what would be your suggestion?

A The Commission has allowed permits to drill in the Blanco Pool. I am sure on tracts that are not 320 acres. I haven't submitted any testimony to them to assist them in that matter. I think they could reach a decision.

Q What do you have in mind suggesting to them as a maximum?

A I don't know whether I will make any such suggestions at all.

MR. SMITH: I started to suggest that, Judge Foster is asking the witness to give what he may testify to in the future. I consider the question improper and object

to it.

MR. FOSTER: I assumed that he comes in and suggests a formula. I am sure he must have had some acreage factor in while otherwise he is running loose. I am trying to find out what the acreage factor the witness has in mind is.

MR. SMITH: The present field route provides for 320 acre units.

A Yes, they do.

MR. SMITH: It is based on the 320 acres?

A Yes, that is correct.

MR. FOSTER: Does that mean that he now has in mind the 320 acres?

MR. SMITH: I don't know what he has in mind.

MR. FOSTER: You didn't answer the question for me. You didn't give me any information.

MR. SPURRIER: Gentlemen, at the risk of cutting someone off here let's recess until 1:30.

(Recess)

MR. SPURRIER: The meeting will come to order and we will proceed with Mr. Bond on the stand, please.

MR. SMITH: May it please the Commission, before I forget it, I don't believe I have introduced in the evidence all the exhibits we have. I would like to do that at this time.

MR. SPURRIER: They will be accepted. Dan Johnston, do you have a question?

MR. JOHNSTON: No questions, thank you, Mr. Spurrier.

MR. SPURRIER: Anyone else? If not the witness may be excused.

(Witness excused.)

MR. SMITH: That concludes the testimony which we have to offer, may it please the Commission.

MR. SPURRIER: Does anyone else have any testimony to offer?

MR. DAVIS: Yes, sir, we have.

VAN THOMPSON,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. DAVIS:

MR. DAVIS: I believe he has previously testified before the Commission.

MR. SPURRIER: That is correct.

MR. DAVIS: Are you satisfied with his qualifications as an expert?

MR. SPURRIER: Yes.

Q Will you please state your name?

A Van Thompson.

Q With whom are you employed?

A Southern Union Gas.

Q How long have you been employed with the Southern Union Gas Company?

A Since 1930.

Q Are you familiar with the production and operations of the gas wells in the Blanco Mesaverde Pool?

A Yes, sir.

Q Both from historical standpoint and present production also?

A Yes, sir.

Q First, Mr. Thompson, I would like to get the record clear as to our positions on proration of the Blanco Pool as a field-wide proration order. What is our position in that matter?

A We are opposed to it.

Q Going back a little bit on historical information from that area, I would like to ask you, do you know of any pool or area where there has been a pipe line constructed prior to the drilling of a well?

A No, sir.

Q Or obtaining production from a well?

A First you have got to have the gas wells before you can build a pipe line.

Q Does it not follow that once you get production, pipe lines are constructed and as an additional production is obtained additional pipe lines are constructed to take care

of the capability of the wells to produce?

A That is correct. As more wells are developed the pipe line system is expanded to take care of the additional gas capacity.

Q Mr. Thompson, there has been certain information in testimony here this morning to the effect that the present wells and those supposed to be drilled in the area will be either equal to or in excess of the pipe line capacity. Would you elaborate on that a little bit?

A First, the pipe line capacity in the area is far in excess of the capacity of the wells. As more wells are drilled, it will increase the capacity of our pipe line. At the present time there is a shortage of gas in the area to supply our markets and El Paso's also.

Q I believe it has already been testified to that our markets are primarily Santa Fe, Albuquerque and surrounding towns, including Los Alamos.

A That is right. It is within the State, except a small amount that goes up to Durango.

Q In your opinion, do you think that the present drilling program will be sufficient to take care of our needs to the pipe line connections that will get on a prorated basis?

A No, sir.

Q In other words, you think that we can use minimal wells than we have now connected to our pipe lines?

A That is right, our load is going at a rate of peak load of about twenty million feet per year and our old wells are declining at the rate of ten million feet per year. So that at our present requirements or about thirty million feet per day per year, increase.

Q Mr. Thompson, in connection with the proration, I would like to ask you if Southern Union participated to an extent in discussion of the proposed proration of gas up in this area prior to the filing of the applicants applications here?

A The first we heard of this proration order was after it had been filed.

Q In other words -

A (Interrupting) Later on we had, I think, we met with them one time and discussed it.

Q When did you have some information that it was a possibility, but we had no definite information of the present proposed order until after the application had been filed?

A That is right.

Q Did we make any suggestions at this conference or recommendations as to, if proration was needed what it should be?

A We recommended that if they had to have proration that it be put on a pipe line basis.

Q Isn't it true then, in effect, Southern Union presently is prorating its wells on a pipe line by pipe line basis, on the basis of deliverability?

A That is right.

Q Do you have any other suggestions or recommendations on this proration order?

A No, I don't believe so.

MR. DAVIS: I believe that is all we have.

MR. SPURRIER: That is all of the direct examination. Does anyone have a question of the witness?

MR. SMITH: As I understand it, your company has no objections to proration at this time?

A We object to proration on a pool-wide basis and we don't think that proration of any kind is necessary for several years to come. We think in effect that we are prorating already on a pipe line basis.

Q (By MR. SMITH) You stated that you consider the drilling program out there insufficient to supply your demands under proration. Do you have any statistics or figures on that to back up the statement?

A I didn't necessarily mean on proration, I meant on any kind of basis.

Q In other words, your present market demand is sufficient to take care of additional wells that are drilled out there even at the rate of 14 additional

wells per month?

A I think so, yes.

Q What is the capacity of your pipe line?

A The present capacity of the pipe line is on the order of 120 million feet per day.

Q There has been some testimony to the effect that it was forty five million. Did you or anyone in your company that you know of supply the figures to us at our request?

A No, sir. I will correct that a little bit. Lewis Bond ask me about ten o'clock if that one particular line had about that capacity and I said I think so.

Q Which line?

A The one line running into the Blanco, and I wasn't considering the other two lines coming in another place.

Q The one in the upper northwest corner?

A No, sir. I was talking about this particular line here in addition to that, we have this line here and we also have a line which you don't have on there, which runs up through here (indicating).

Q You have three lines altogether?

A That is right.

Q That capacity varies according to the pressure it receives?

A It varies according to the pressure, yes, sir, and

size of the pipe.

Q Size of the pipe. What is the pressure and size of the pipe reflected by the three different connections in there?

A These two upper ones vary between 300 and 500 pounds, depending on the season the line over there on the Blanco area varies from 500 to as much as 650.

Q They all feed into a common line down here?

A No, that isn't quite right. This particular line feeds through a compress or station and then goes into the main line. This line feeds directly into the main line.

Q What is the pressure of this line here?

A At the present time, 650.

Q You state that the capacity is 120 million, that is based on what pressure figures?

A That is the capacity of this particular line here, which has all these feeder lines coming into it. At the present time we are increasing this line and putting in 15 miles of 20 inch right in here, and next year we have substantial additional improvements planned.

Q When will that completion program be finished?

A I don't think it will ever be finished.

Q You contemplate continuing to this, the size of this line, so that you can take the gas up there, the gas that

is available?

A That is right.

Q Wouldn't that be controlled by the market demand?

A That is right.

Q What markets do you have?

A Just the local Albuquerque, Santa Fe, Los Alamos, this particular area.

Q Do you have any economic figures on what the saturation point may be in those areas?

A No, sir.

Q You don't know whether it would require as much as 120 million?

A Yes, we know it will require more than that this very year. This year we have had already, we have had to interrupt all of our industrial costumers, the power plants and railroad shops, because we didn't have enough gas to supply.

Q How much are you supplying now?

A Today we are running between 80 and 100 million a day.

Q Are you familiar with the pipe line capacity of El Paso?

A No, sir.

Q What other gas field are you producing from besides Blanco?

A We are producing from Kutz Canyon field and also Barker Dome.

Q Your figures on market demandtake that production into consideration?

A Yes.

Q 80 to 100 million would include production from those fields?

A Yes.

Q What do you estimate your production that you are not taking from the Blanco field to be?

A We are taking it on the order of 20 million feet per day.

Q That is all the connected wells that you have?

A All the connected wells that we have tied to the pipe line, that is all they will produce into our pipe line.

MR. DAVIS: Mr. Chairman, one more question I failed to bring out but I do want the record to be straight on this. Has Southern Union ever refused a connection with either of the areas we have talked about in addition to the Blanco field? Are we always in the market for gas?

A Yes, sir.

MR. DAVIS: That is all.

MR. SPURRIER: Mr. Thompson, do you know what your average daily take would be for this year?

A No, I can tell you on an annual basis. It will be about 18 million feet for the year 1951.

MR. SPURRIER: 18 million.

A 18 million feet, yes, sir.

MR. SPURRIER: Any other questions?

Q (By MR. SPURRIER) Mr. Thompson, do you know what the deliverability of the combined wells in the Blanco Pool might be at this time?

A No. I don't have any exact figures as to the number of wells we have connected, but I believe it is on the order of 50 and from that 50 we are getting about 20 million feet per day.

Q From 48, I think the figure is 48, from 48 wells how much gas?

A 20 million feet per day.

Q We are speaking of Blanco now as a pool.

A That is right.

MR. SPURRIER: Anyone else? Mr. Smith?

MR. SMITH: I am just a little confused as to respective capacity of the feeder lines. What is the capacity of this line?

MR. SPURRIER: That is the La Plata end of the Blanco Pool.

MR. SMITH: In the northwest corner of the Blanco Pool.

A That is dependent on quite a few things, Mr. Smith. One of them is this, one particular line comes all the way down from the storage project here. The storage project is feeding and this line is feeding and this line is feeding,

all feeding into one common line. That particular line has a total capacity of about 30 million feet per day. At the present time we are running anywhere from 7 to as much as 10 million feet a day out of this area. We have just completed this line and we are, it varies 4 or 5 million feet a day. That isn't the capacity of the line. It happens to be there is a bottleneck in the system right here which we had planned to fix with 12 inch pipe down to the compressor station. We haven't got the pipe yet and it won't be done until later in the winter.

Q What is the capacity of the line northwest of Blanco down to the main line that you say comes from the storage project?

A You mean from up here?

Q That is right.

A I would say that particular line has a potential capacity of 40 or 50 million feet a day.

Q What is the size of the line?

A 10 inch.

Q Pressure?

A Varies between 300 and 500.

Q How much do you bring out of your storage project?

A We bring a peak out of there about 12 million feet.

Q Is that altogether during the winter months?

A We only used that storage project on peak days, cases

of emergency.

Q Let's pass to the new line that you have drawn on here in black pencil with which lies midway between the middle Blanco area and northwest Blanco area. What is the capacity of that line?

A The potential capacity of that line would be roughly 30 or 40 million feet per day. The reason we can't take it out is because we don't have the wells connected to it to do it. It was built much larger than the present wells anticipated we would get more.

Q With reference to the middle Blanco, what is the capacity of that line?

A That line is 12 inch, and it has a potential capacity without any additional compressor, or without any compressor, 40 or 45 million a day.

Q That is just to serve the middle Blanco area?

A That is right.

Q Do you have any construction plans to increase the size of that?

A Not at the present time because we are only getting 10 million feet a day out of it.

MR. SMITH: That is all.

By MR. UTZ:

Q You spoke of a location to pipe line or proration pipe line, proration on the basis of deliverability. Would you

clarify what you mean by deliverability?

A What I mean by that was that all the wells in a particular area feed into the pipe line wide open at the well and the only limit to the capacity of the well is the amount they will put into the pipe line.

Q Wide open?

A That is right.

Q Under what kind of back pressure?

A As I explained before, it varies from 300, five places, up to 650 pounds, different parts of the field.

MR. UTZ: That is all I have.

MR. SPURRIER: Anyone else? You may be excused, Mr. Thompson.

(Witness excused.)

MR. SPURRIER: Anyone else have any testimony to present in this case? If not we have some letter to read into the record. We will ask your indulgence since we would like them to appear in the record.

MR. WHITE: Here is a letter from Thomas J. Quigley, Beverly Hills, California dated December 15, 1951.

Gentlemen: The writer was one of the earliest operators in the area above described and is still the owner of royalties and leases and operating interests in several thousand acres in the area.

Long before Mr. Florance drilled the first well which

really opened up that Blanco Mesaverde area, the writer endeavored to interest Stanolind as well as many other companies in prospecting the Blanco Largo Canyon area and turned over some of his land to Mr. Florance in an effort to get the area drilled. So my associates and I are thoroughly familiar with the area, having practically pioneered it.

We have given the matter considerable study and are convinced that proration at this time is ridiculous and would discourage considerable drilling.

I am just in receipt of a letter from one of the largest companies in the United States which is now actively operating in the San Juan basin. I brought them in, personally, after considerable effort and they are now developing some of my lands. They have already drilled a couple of wells on my land and I wrote them ten days ago, asking them about their development plans for 1952 and I quote from a letter received from them just yesterday:

"We understand that plans are afoot for proration and one of the companies interested in that area has applied for proration of production.

Our future development will depend somewhat on developments as to market and price and the results of efforts to prorate production."

Here is concrete evidence that even the thought of

proration has immediately slowed up development. There is no question about its harmful effect upon the Basin at this time.

We sincerely trust you will reject Stanolind's application. Signed T. J. Quigley".

Here is a telegram received from Lawrence C. Kelly, Los Angeles, California, dated December 17, 1951:

"Stanolind petition for gas proration is so meager and lacking in working details that no consideration should be given it Stop I am holder of several federal leases in Blanco area and am interested in two Point Lookout gas wells I respectfully suggest much detail study and many formulae be worked out before considering any method of proration Stop As a member of Conservation Committee of California Oil Producers for more than fifteen years until 1948 I saw great number of formulae which appeared fair in principal worked out before using bring out fantastic results with many gross inequities Stop Many factors must be given weight namely pressures of different formations, economics cost of wells, gas gathering line pressures, government limitations of royalties and many others Stop Proration of gas production does not appear warranted for many years but if added to present high gas line pressures the incentive to drill gas wells is gone Stop Would be great set back to San Juan Basin I am unalterably opposed

to Stanolind petition. Signed Lawrence C. Kelly."

Here is a telegram from Sunray Oil Corporation, Tulsa, Oklahoma, dated December 17, 1951:

"RE: Case Number 330, December 18, 1951 Stanolind application to make more definite and certain rules applicable to Blanco-Mesaverde gas field, San Juan County

This company normally favors adoption of rules providing for equitable gas allocation where sufficient production and reservoir information is available. We have two wells on approximately 6700 acres in Blanco field and therefore in absence of such information have no recommendations to make at this time. Sunray Oil Corporation - William L. Horner, Chief Engineer."

Here is a letter from William Mansfield, Farmington, New Mexico, dated December 15, 1951, regarding proration of natural gas.

"To Whom it May Concern: The proration should cover all gas wells regardless of the formation the wells are producing from or from any formation that is not producing from at any time, that become productive at any time hereafter.

All gas wells regardless of size should be given an equal basis, (nct an equal percentage basis), and this proviso should continue permanently until the smaller wells are producing their capacity, through the same size tubing

used in all wells, and at this time if the market demand is greater than the smaller wells can produce, the larger wells should be allowed to produce the over amount of the market demand.

In regards to differential governing gas wells that deliver gas into different main liner gas pipe lines, there should not be any difference of proration, unless it is necessary to reduce overhead operation, and in this event the average per well per year, should be adjusted during not over one year.

The State of New Mexico, and the Department of the Interior of the United States or its field agents, should employ experienced gas engineers on a permanent basis, to check all wells, and equipment used in the measurement and deliverability of gas produced, and delivered into all pipe lines regardless of ownership of the wells. The engineers employed for this work shall make daily reports on a monthly basis, to their respective superiors and their respective superiors shall adjust any discrepancies found, within a period of 30 days after such faults are found.

If there is not a sufficient income being paid to the state and government agencies who have the jurisdiction over the departments regularly assigned to administer these problems, then the amount of tax being paid to these

agencies should be increased a sufficient amount to properly take care of the work of the engineers and necessary assistants. Signed William Mansfield."

MR. SPURRIER: Does anyone have any further comment?

MR. DAVIS: I would like to make a statement. Southern Union believes that the Oil Conservation Act contemplates proration only in the event of present waste or a destruction of correlative rights. We do not believe that Stanolind has shown that any of that exists in the Blanco Pool and practically all of their testimony has been what might happen in the future. In view of those circumstances, we recommend that the application for proration of the Blanco Pool at this time be denied.

MR. SMITH: Well naturally, we want to support our application. I think our exhibits that we have introduced as well as the testimony amply support the application for proration at this time. The time to keep your horse from being stolen is before it is stolen. If we believe before the inequities do develop and try to rush into a manner of proration which may afford recompense it is impossible to make adjustments that would protect the people. We are suggesting a system of proration which I think has been misunderstood,

particularly in view of some of the letters read into the record. We are not attempting to think of it. We would result in limiting the market demand or amount of gas taken from the field. We are merely suggesting that consideration be given by the Commission to putting out such rules as will afford an equitable tactically in the area colored on Exhibit 8 as in yellow and blue, it is obvious in there that if one of the purchasing companies should take an excessive amount of gas to supply their particular market demand for a period of two or three years or even longer, that an imbalance will occur. It is self evident because you have offsetting leases dedicated to different purchasing companies. Now, if we wait until that time does come about, we have damage which cannot be measured because it is difficult to ascertain precisely how much damage may have occurred. So that we are suggesting at the time to put proration in before the damage occurs and we think that at the present, damage to correlative rights has been demonstrated through the fact that a number of wells may be shut in and frozen in and not given an opportunity to deliver their proportionate part of the gas to satisfy the appropriate market demand. You will note in our suggested rule that we have, go on a bottom hole pressure, or rather a potential test basis which is in affect

deliverability, because the company out there will take from these wells what they can during the first year. I think this first year, during that period of time, the Commission will have a chance to see how proration works out there and can definitely formulate a fair policy for all the people concerned, both purchasers and producers at the time and before there will be a possibility of waste or damage to the respective producing leases.

It is difficult of course, to express exactly what this damage may be, and it is very essential by its very difficulty we think that the time to institute rules which you know will set up a fair and equitable formula is, instead of leaving it to chance, to determine whether a rule should go into effect. In other words, what I am saying is that if it gets to a point where the imbalance does exist well then we will be confronted with the actual situation, with no past proration experience, no opportunity to determine how the wells will produce, whether it should be on a deliverability basis or test basis, we may have to spend months or years to determine what the productive capacity of the wells would be. And by that time, of course, the damage will be more or less aggravated. We think that protection of the royalty owners and the small operators in that field as to major companies demands that the proration rules be instituted now.

MR. SPURRIER: Did you, during your presentation of testimony, advocate proration by pipe line or on a pool-wide basis?

MR. SMITH: We feel that on a pool-wide basis is the equitable way to do it.

MR. LOCKE: I would like to make a statement, Mr. Spurrier. I want to say amen to every thing said by Southern Union as to conjecture quality of proof by Stanolind referring to the item of damage. I want to point out a real damage that will occur if proration is placed in the Basin in this year. Our companies commenced operation on August 1, 1951, on January 1, we will have three Pictured Cliffs and two Mesaverde tied into the pipe line. Our program is twenty wells in Largo Canyon. If this goes in, our capital, being risk capital, will not be available for the drilling of the wells. There is a real damage to the State of New Mexico in development of gas for markets in the San Juan Basin. It seems to me as a lawyer, that if I came in with a case so conjectural as has been presented here today that I would feel embarrassed to get up and contend that I should be given relief.

MR. SPURRIER: Anyone else? Mr. Stone.

MR. STONE: I represent Ralph A. Johnston. We have three wells, Mesaverde wells, in that red outline, and on

some 4000 acres. As an independent operator, we have not been consulted at any time, at least I have no reference of it in connection with proration. I think properly handled, and at the opportune time it is a wonderful thing. At this time it is neither practical or feasible. Also, on the basis of the testimony shown, I can find no inequities, no over production in gas and as far as the seller or producer of gas to contemplate what the purchaser would do toward taking it. I think it is far fetched. We are definitely opppsed to it.

MR. SPURRIER: Anyone else? Mr. Morrell.

MR. MORRELL: No statement, thank you.

MR. GORDON: With the Three States Natural Gas Company, we have five wells now completed and some of them would be in the immediate area affected. We contemplate drilling between seventy five and eighty wells. That is based, that program is based, on our confidence that the pipe line outlet to this field will be sufficient to take the production developed in the area. At this time we feel that proration as suggested is not required, but should any inequities develop, we will be glad to go into any proration that is proposed for the field in the future.

MR. SPURRIER: Thank you. Anyone else? Mr. Bolack.

MR. BOLACK: Mr. Chairman, I have interest in a number of gas wells in the Blanco field. Some of them are over-

rides. Some are half interest workings. I feel that proration at this time would definitely curtail considerable activity in that area. I won't say that the suggestion is wrong. I feel it is just a little bit ahead of schedule. I feel that their testimony stating that powerful line pressures are maintained in that area, I believe that wells producing against comparable line pressure will automatically prorate themselves as accurately as can be done mechanically. I would concur in practically all the statements of Southern Union. I oppose it.

MR. SPURRIER: Anyone else? Mr. Barnes.

MR. BARNES: Mr. Spurrier, I am representing Frank Barnes, an independent geologist, Mr. John Price, an associate of Aztec, and Mr. William Mansfield, of Farmington, and Kingsley-Locke Oil Company. I would like to state for the record that I am not personally opposed to proration as such or in principle, but that myself and my associates are opposed to proration at this particular time because we feel that it would damage development in the San Juan Basin and would result in the drilling of considerably numerous, numbers of gas reduced, numbers of gas wells over the next few years. I would like to make a suggestion to the Commission that this petition be denied and that in the present time the Commission appoint a Board to study this situation impartially and make a recommendation to the

Commission within the next six months on the feasibility of proration at that time.

MR. SPURRIER: Anyone else?

MR. RICHARDSON: I represent Lowry and Associates, and all I would like to say is to emphasize what Mr. Locke has said that I represent some independents, and we are not operating on the same scale as the Blanco is, although we have twelve rigs running. They have twenty five up there. We have got sixteen wells in the process of being drilled and hope to complete those in the next couple of months. The time just doesn't seem right to me to come in here with a proration order and result in quite a lot of development coming to a halt up there.

MR. SPURRIER: Anyone else? If not, if there is no further testimony, the case is concluded and will be taken under advisement.

(Whereupon the hearing was adjourned.)

STATE OF NEW MEXICO)
:
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of proceedings before the Oil Conservation Commission, State of New Mexico, at Santa Fe, in Case No. 330, is a true and correct record of the same to the best of my knowledge, skill and ability.

Dated at Albuquerque, New Mexico, this 19th day of January, 1952.

Ida Kearney

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JAN 23 1952
RECEIVED

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

SPECIAL HEARING

December 18, 1951

- -

Case 330 will come before the Commission at 10 a. m., on this date at Mabry Hall, Santa Fe, New Mexico. This is concerned with Stanolind Oil and Gas Company's petition relating to the proration of natural gas in the Blanco (Mesaverde) gas pool, San Juan County, New Mexico and extension of the boundaries of the Blanco Pool.

BEFORE:

Hon. Governor Edwin L. Mechem, Chairman
Hon. Guy Shepard, Member
Hon. R. R. Spurrier, Member and Secretary

REGISTER:

R. S. Dewey
Humble Oil and Refining Company
Midland, Texas

Lewis H. Bond, Jr.
Stanolind Oil and Gas Company
Fort Worth, Texas

W. J. Nuss, Jr.
Stanolind Oil and Gas Company
Lubbock, Texas

J. K. Smith
Stanolind Oil and Gas Company
Fort Worth, Texas

O. Seth
Stanolind Oil and Gas Company
Fort Worth, Texas

Jason Kellahin
Oil Conservation Commission
Santa Fe, New Mexico

Jack M. Campbell
Campbell&Stein
Roswell, New Mexico

G. B. Jenkinson
Stanolind Oil Company
Tulsa, Oklahoma

P. P. Manion, Jr.
Stanolind Oil Company
Tulsa, Oklahoma

R. S. Christie
Amerada Petroleum Corporation
Tulsa, Oklahoma

Van Thompson
Southern Union Gas Company
Dallas, Texas

Quilman B. Davis
Southern Union Gas Company
Dallas, Texas

Joseph C. Gordon
Three States Natural Gas Company
Dallas, Texas

J. W. Cole, Jr.
Gulf Oil Corporation
Fort Worth, Texas

W. L. Barksdale
Dunn and Boreing
Denver, Colorado

C. C. Cragin
El Paso Natural Gas Company
El Paso, Texas

C. L. Perkins
El Paso Natural Gas Company
El Paso, Texas

Ben R. Howell
El Paso Natural Gas Company
El Paso, Texas

W. L. Taylor
El Paso Natural Gas Company
El Paso, Texas

W. T. Hollis
El Paso Natural Gas Company
El Paso, Texas

R. W. Harris
El Paso Natural Gas Company
El Paso, Texas

George D. Locke
Kingsley-Locke Oil Company

Joe V. Peacock
Phillips Petroleum Company

E. H. Foster
Phillips Petroleum Company

C. W. Binkley
Phillip Petroleum Company

Elvis A. Utz
Oil Conservation Commission
Santa Fe, New Mexico

I. R. Trujillo
Oil Conservation Commission
Santa Fe, New Mexico

R. S. Blynn
Oil Conservation Commission
Hobbs, New Mexico

Fred D. Gorham, Jr.
Pubco Development Company
Albuquerque, New Mexico

Aaron L. Calvin
Delhi
Dallas, Texas

R. G. Carlin
Delhi
Dallas, Texas

Alfred E. McLane
Delhi
Dallas, Texas

Clifford Smith
Delhi
Dallas, Texas

J. B. Howell
Delhi Oil Company
Farmington, New Mexico

Frank C. Barnes
Independent
Santa Fe, New Mexico

Robert E. Murphy
Magnolia Petroleum Company
Roswell, New Mexico

James L. Pasey
Magnolia Petroleum Company
Albuquerque, New Mexico.

S. P. Hannifin
Magnolia Petroleum Company
Albuquerque, New Mexico

E. R. Richardson
Lowry et al
Albuquerque, New Mexico

Dan W. Johnston
Albuquerque, New Mexico

T. H. McElvain
Independent
Santa Fe, New Mexico

J. R. Cob
Southern Union Gas Company
Santa Fe, New Mexico

- - - - -

MR. SPURRIER: The meeting will come to order. The first and only case which we will consider today is Case No. 330. Mr. Kellahin.

(Mr. Kellahin reads the notice of publication.)

MR. SMITH: My name is J. K. Smith. I represent Stanolind Oil and Gas. I would like to enter an appearance on behalf of Mr. Oliver Seth for the Stanolind Oil and Gas Company.

As stated in the notice of hearing, the purpose of the hearing is to consider the proration of gas in the Blanco Mesaverde Pool. Also, consideration of the enlargement of the limits of the Blanco Mesaverde Pool. As stated in the notice, our purpose is to make more definite and certain the provisions of Section 11 of Order R-799 as extended by R-110 which prescribed that wells should be by proration units in the field.

This hearing is a continuation of earlier hearings held in the past. One of October 28, 1948 which resulted in Order R-799 fixing the spacing and providing other rules and Order No. R-110 as a result of a hearing on October 23, 1951 which changed certain of the completion practices in the field. Also Order No. R-89 which changed certain of the field limits. I would like to emphasize that the hearing is to be confined to the Blanco Mesaverde Pool only. We are not asking for any tightening procedure of any gas wells in the State. It is just restricted as stated already to Blanco Mesaverde Pool. I would like also to point out that the purpose of the hearing is not to restrict the production which may be based upon the market demand, but merely that

demand be spread equally throughout the entire pool. I should like to offer additional testimony in addition to that given at the earlier hearing by calling Mr. Frank Nuss as our first witness. I don't believe Mr. Nuss has testified before and it will be necessary to call upon him and have him sworn as a witness.

FRANK NUSS,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. SMITH:

Q Will you state your name, please?

A W. F. Nuss, Jr.

Q Mr. Nuss, where are you employed?

A I am employed by Stanolind Gas and Oil in Lubbock.

Q How long have you been so employed?

A I have been with Stanolind slightly over six years.

Q Will you state your educational background?

A I have a degree in chemistry and physics and considerable extra training in petroleum engineer.

Q Where did you get your degree?

A Texas Christian University.

Q What degree?

A Bachelor of Arts, Chemistry.

Q Have you worked for any company besides Stanolind Oil and Gas?

A No.

Q The work that you have done with Stanolind Oil and Gas Company, what has it been?

A My work has been primarily reservoir engineer and evaluations.

Q Just a moment.

MR. SMITH: Would the Commission accept this witness's qualifications as an expert?

MR. SPURRIER: They will.

Q Mr. Muss, in your capacity as reservoir engineer among the capacities that you have, I will ask if you have made certain studies with respect to the Blanco Mesaverde Pool?

A Yes, we have made fairly extensive study.

Q Will you state something with respect to the producing zone of the Blanco Mesaverde Pool?

A I have considerable history here. Gas Production in the Blanco Mesaverde Pool is obtained from the blanket sandstones of the Cliffhouse and Point Lookout formations of upper cretacious age which lying at a depth of between 3800' on the top of the Cliffhouse to approximately 5500' on the base of the Point Lookout formation. The two zones are separated by the Menefee formation which averages approximately 400' in thickness and which is not considered a major source of gas in the reservoir.

The pool is located in northeastern San Juan County, New Mexico, the gas production was originally discovered by Huntington Park No. 1 through the Goede, presently the Delhi No. 1 W. M. Mansfield which was originally a dual completion in the Pictured Cliffs and Mesaverde formation located in Section 29, 30 North, Range 9 West.

This well, which was originally completed in 1927, has supplied gas to the town of Aztec since 1929 and has a total circumlative production from the Mesaverde in excess of 1,000,000 MCF.

Q What has been the field production history of this particular pool?

A I would like to offer as our first exhibit a tabulation of the production history for the pool.

(Mark Exhibit No. 1 for identification.)

A (Continuing) The data I have compiled here is taken from a report made by Brokaw, McKee and Dixon from the beginning of production in the pool through 1948. The remainder of the data is taken from New Mexico Oil and Gas Engineering Company records.

It indicates a total cumulative production as of November 1, 1951 for the Blanco Mesaverde of 8,139,779 MCF of gas. Of that figure, 5,851,281 MCF have been producing during the first ten months of 1951. These figures indicate that the production during 1951 will represent something

better than 70% of the total cumulative production from the field.

Q What are the present area limits? Do you have any exhibits that show the area limits of the field?

A I have an exhibit which will be Our No. 2.

(Marked Exhibit No. 2 for identification.)

A (Continuing) This map indicates the present outlines of the pool as established by the New Mexico Oil Conservation Commission under order R-89.

Q Is that the area outlined in red?

A It is the area outlined in red.

Q Will you explain the significance of that area outlined in green?

A The area outlined in green in this center portion of the field right directly north and east of it is the area which is included in our petition for the addition to the pool.

Q In other words, the area indicated in green is additional area limits that we are now asking?

A Yes. Gas saturation is found throughout this entire area even outside the field limits, but the commercial collection of gas wells is controlled by development of sufficient porosity and permeability in the formation to permit gas production at an economical rate. As of December 12, 1951, approximately 144 wells have been

completed in the pool. On that date there were 23 drilling rigs in operation in the field. The completion of wells in the area generally involves stimulation of the formation with large amounts of nitroglycerin, and in recent months the institution of rotary drilling with gas as a circulating medium has indicated excellent possibilities in the reduction of drilling and completion costs and improvement of completion procedures. In improving our completion techniques it is accepted by the majority of operators in the field that contamination of the formation through drilling well fluids when water base mud is used results in a decreased deliverability over other methods of completion.

Q State something with respect to characteristics of the producing formations.

A Geologically, the producing sandstones in the Mesaverde formation, the Cliffhouse and Point Lookout intervals, are blanket sandstones of upper cretacious age. They are composed of Marine deposited yellow to brown and cream colored sandstone beds with some sandy shale. Exhibit 3 electrical characteristics of the Mesaverde are indicated by the electric logs of the Stanolind Elliott "A" No. 1 which is representative of the producing horizon.

Q State briefly what the characteristics are.

A On this log I have marked the top of the Cliffhouse, the top of the Menefee and Point Lookout formations, the three

zones which comprised the Mesaverde Pool, also the top of the shale at the base. The electrical characteristics are thoroughly accurate.

(Marked Exhibit No. 3 for identification.)

Q What is your testimony with respect to the porosity and permeability in the producing area?

A On the basis of the core analysis data the average porosity for the Cliffhouse 10.6%, for the Point Lookout 9.7%. The permeability for the Cliffhouse .55 millardarcies and for the Point Lookout 1.4 millardarcies. We actually have very few cores, because of loss of circulation in the producing intervals.

Q What about your water saturation?

A I am inclined to believe that the water saturation as measured by core analysis are not representative of the formation especially taken with the water base mud.

Q What are the characteristics of the well with respect to any stabilization that may be required to get an accurate test?

A Well, the wells require a long stabilization period for this reason. We believe that deliverability tests against a uniform back pressure are much more representative and will result in a better test of the producing characteristics. The thickness of the two intervals is slightly over the area, the average thickness of the Cliffhouse and Point Lookout is approximately 60' each. There is no indication that geologic

structure has any direct influence on porosity and permeability.

Q That is the producing reservoir itself?

A That is in the reservoir.

(Marked Exhibit No. 4 for identification.)

Q I hand you what has been marked for identification as Exhibit No. 4 and ask you to state what it represents.

A This is a structural map contoured on the top of the Cliffhouse section in the center portion of the field that is the area in which Stanolind's chief acreage is located. Contour interval is on 50' basis. Contours indicate the top of the Cliffhouse pay section above sea level. Examination of the potentials of the wells in the area with respect to the structural location definitely indicates the structure has little effect on the capacity of the wells to produce. The sediments in the area with respect to this structure dip gently to the northeast from the outcropping formation approximately 50 miles to the southwest of this area of the field.

Q I asked you to state generally about the permeabilities in this area there and what they indicate with respect to the outcrop.

A The low permeability in the sands and also the apparent detrimental effect of fresh water on the formation indicates that the reservoir itself is isolated

from the outcrop and our production in the field will be by volumetric expansion of the gas. Cliffhouse and Point Lookout are open to a common well bore and a number of completions in the field.

Q What type of gas do we have out there, sweet gas?

A It is a sweet gas average gravity of approximately.67. We recover small volumes of condensate in the field. The production data at this time is insufficient to indicate a uniform average for the field. Original bottom hole pressure 1364 in the formation.

Q What about the bottom hole pressures in the field, what evidence do you have with this?

A Our best predetermination of the original 1364 pounds per square inch shut in the formation.

Q What evidence do we have about the present bottom hole pressures that may be encountered?

A I don't have any recent bottom hole pressure data.

Q Any indication of any sharp decline?

A Not on the recent completions of all wells.

Q With respect to the purchasers of gas in that area what companies are purchasing gas at the present time?

A There are two pipe line supply systems. The El Paso and Southern Union Gas Company. Their lines and the production in the Blanco Pool extend over an area some 48 miles in length and 8 to 12 miles in width, a total of 270,000

acres.

Q That is the total acreage in the Blanco Mesaverde Pool at the present time?

A That includes the additional which we -

Q (Interrupting) The general area that we would like to add on?

A Yes. The developing in the field is on 320 acre spacing and gas production at the present time is against approximately 500 pounds line pressure in the El Paso line and the main Southern Union line, and approximately 300 pounds line pressure in the Southern Union La Plata line. That is the northwest portion of the field.

Q What about the additional development that may be going on in the field at the present time?

A The additional development in the area which we have colored green up there has resulted in commercial production from the Mesaverde zone and definitely indicates the desirability of an extension of the field limits for that area. I would like to offer this Exhibit.

(Marked Exhibit No. 5 for identification.)

Q I hand you Exhibit 5 and ask you to state what it purports to reflect.

A This Exhibit lists the recent completions in the area which is colored green on our Exhibit No. 2. It lists the lease well, number, location and zone in which the wells

are completed and the potential. There are nine wells which have been completed in that area, that is as of December 12. The potentials range from approximately 3300 MCF per day to 11,000 MCF per day. Each of the wells was completed in all three zones. That is the Cliffhouse, Menefee and Point Lookout formations are all open.

Q Specifically what sections will be included in the added area?

A The specific sections, they are all in Range 8 West. In Township 29 North there are Sections 1, 2, 3, 12 and 13. In Township 30 North, Sections 1, 2, 3, 10 through 15, 22 through 27, 34, 35, 36. In Township 31 North, Sections 25 through 36. During October of this year 80 wells which were completed and producing in the field made a total of 1,466,889 MCF. That is a rate of 47,280 MCF per day or 591 per well MCF, per well per day.

Q How many wells completed in the field as of recent date?

A Latest date December 1, 144 wells completed as of that date. These 144 completions indicate that the field average potential average per well will be approximately 2,650 MCF per day.

Q How many wells were running during September, October, November continuously in that area?

A During that period approximately 25 rigs were running

average during the period they were completing 14 wells per month or approximately 168 wells per year. On the basis of the pipe line capacities which have been supplied by the purchasers we have an indication of 70,000,000 cubic feet per day for El Paso Natural Gas Company and 45,000,000 cubic feet for Southern Union Gas Company.

Q Have you worked out the average deliverability of the wells and are you able to show how the capacity is being approached?

A Considering that the average deliverability of the wells during October of this year will represent the additional wells which will be completed, the capacity of 115,000,000 cubic feet per day can be supplied by 195 producing wells. At the present time, 144 wells are completed leaving 51 wells only to be drilled before the pipe line capacity from the field will be met. At the present rate of completion of wells this will require approximately four months improvement in completion techniques which will increase the well deliverability.

Q Is there a possibility of any acceleration of that date due to improved completion techniques?

A There is a definite possibility that improvement will reduce the time required to meet the pipe line capacities.

Q That will be due to increased deliverability of the wells completed?

A That's right. Under the presently indicated productive acreage for the field approximately 846 wells will be needed for complete development. At the present rate of completion, the field will be completely developed within 4.3 years. These factors indicate that continued development of the field will result in producing capacity in excess of transmission capacity during the coming year and proration of gas will be necessary to assure rateable takes among the wells in the field.

MR. SMITH: In your opinion, you consider that in order to extend into this at this particular time, it is necessary that we attempt some sort of proration. I have no further questions of this witness.

MR. SPURRIER: Does anyone else have a question of this witness?

MR. LOCKE: I would like to ask one question.

Q (By MR. LOCKE) In what State do they use the method of proration suggested by you?

A Sir?

Q What State uses the method of proration suggested by you?

A I am sure it is used in Texas.

Q You suggested a method of proration a moment ago in your testimony. I asked you to name a State in which that

system of proration is being enforced.

A I am sorry sir, I haven't suggested a method of proration. I believe the method that we are proposing is used in Texas.

MR. LOCKE: That is all.

MR. SPURRIER: Mr. Davis.

MR. DAVIS: I would like to ask you, Mr. Nuss, in making a statement here a minute ago about the fact that wells now in progress within four months, I believe you said, would satisfy the market requirements of the pipe line companies in the Blanco Mesaverde Pool. Do you have any information as to the market requirements of the pipe line company for the future in making that statement?

A I have only -

MR. DAVIS: (Interrupting) What do you base it on?

MR. SMITH: I don't believe he testified with respect to market demand. That is to pipe line capacity.

MR. DAVIS: That is with respect to pipe lines now implaced there.

MR. SMITH: That is right.

MR. BARNES: You spoke about the deliverability of the well. What is the deliverability based on, is that actual line input or based on initial potential?

A The deliverability which I have used in the estimates is based on the actual production on wells which were

producing during October of this year.

Q (By MR. BARNES) That is based on actual line input for the month of October?

A That is right.

Q You are projecting that same production when you say that you believe the wells will very shortly be producing more than the pipe line capacity?

A The same average deliverability in the pipe line.

Q Do you have a figure here as to what the absolute total pipe line capacity is at the present time?

A The only figure that I have is the figure which has been supplied to my company by the pipe line outlets, that is the two which I gave previously. I would like to have confirmation of those if we can get it.

Q You based your figure on a statement there and you don't actually have any accurate data to indicate what the actual pipe line capacity is at this time or what it is likely to b

A I used the best figures which we were able to get for the capacity.

MR. SMITH: You obtained those figures from the purchasing companies direct, did you not?

A Yes, sir.

MR. SMITH: That is all.

MR. BARNES: That is all.

Q (By MR. FOSTER) Mr. Nuss, you used the term deliverability, in your thinking is that synonymous with potential?

A No, sir. The deliverability which I am using in this case I am thinking of actual production into a pipe line.

Q Against some assumed pipe line pressure?

A Yes, sir, I believe it has been running approximately 500 pounds in most of the field.

Q In your thinking, how do you use the term potential?

A The potentials which have been reported are supposedly open flow potential that is against atmospheric pressure.

Q Is that at the sandface or at the top of the pipe in your definition of the term?

A I believe that the reported potentials would be with atmospheric pressure at the surface.

Q At the surface. What size pipe do you have in mind there in determining those potentials?

A I haven't used potentials now in any of my calculations.

Q I understand.

A As far as I know the size of the pipe varies somewhat over the field. We are not recommending the potential.

Q What is the variation in pipe size?

A I don't have any figures on that.

Q You just know that it does vary?

A Yes.

Q Some speculation as to what the variation might be in

pipe size?

A I don't have any direct information.

Q What size pipe do you use in your well?

A I believe we are setting five and a half.

Q Do you know of any smaller size used by other companies?

A I don't have any direct knowledge of that, no, sir.

Q Do you know of a larger size used by other companies?

A I don't have any direct knowledge on either of those.

Q You don't apply the use of any friction factors in determining your wellhead potential?

A Would you state that again, please?

Q Do you use any friction factors in determining your wellhead potential?

MR. SMITH: I don't believe Mr. Nuss's testimony covered that on direct examination.

MR. FOSTER: Are you objecting to it?

MR. SMITH: No, I am not objecting. Is this direct examination here. It is not part of the cross-examination.

MR. FOSTER: That might be a matter of opinion. We are interested, of course, he testified about gas proration. We don't have any rock in the bucket at this time but I can see on a system of gas proration and what you apply here in this field, you might well apply in some other field where we are interested. I just simply want, of course, if Mr. Smith doesn't want to answer.

MR. SMITH: I have no objection to his answering the question.

Q (By MR. FOSTER) Would you answer?

A Would you state your question again?

Q Do you use any friction factors in determining the wellhead potential?

A When we are calculating open flow potential from back pressure test for our own wells we normally use the friction factor in calculating that.

Q Do you calculate it back to the sand face?

A That's right, yes, sir.

Q These open flow potentials that you are talking about are really calculated as the potential of the well at the sand face?

A Well now, I am not familiar with the way most of those were calculated. We have taken the reported potentials for most of the operators. I know how mine were calculated.

Q You haven't suggested the adoption of any proration formula for prorating gas in the field, you yourself?

A Myself, I have not.

Q Some other witness will do that, I assume?

A Yes.

MR. FOSTER: That is all.

Q (By MR. SHEPARD) Have you had any trouble in obtaining connections?

A Stanolind hasn't, no sir.

Q (By MR. KELLAHIN) In your testimony as to the producing formation, I recall that you said that the formation is a yellow or brown sand and some sandy shale.

A Yes, sir.

Q In connection with that you testified as to the porosity and permeability of that formation on the basis of core analysis?

A Yes.

Q Could you say how many of the core analysis were available to you?

A I believe there were a total of six core analysis.

Q Would you say there was any variation over the field in the porosity and permeability?

A As I recall there was not a large variation.

Q There would be some?

A There was some, certainly.

Q What effect, in your opinion, would the variation in porosity and permeability have on the correlative rights, for example the land that overlay the area of less permeability?

A I wouldn't, if you could state that a little different. I don't understand what you mean by the question.

Q The question I have in mind is this. What effect would the institution of the temporary proration system

which Stanolind has suggested have on the protection of correlative rights?

A In other words, what effect, let me see if I understand you, what effect would the use of the proration formula that we are proposing have on correlative rights.

Q Yes.

A I believe the formula we are proposing will represent a reasonable protection of the correlative rights. In other words, I feel that the variation of porosity and permeability and the formula which we are proposing are, you might say, in accordance with each other.

Q In other words, you don't think there is sufficient variation that it would have only material fact?

A I think they would about cancel each other out.

MR. FOSTER: What is the formula that you propose?

MR. SMITH: That formula will be covered by a different witness.

MR. FOSTER: Alright.

Q (By MR. DAVIS) I believe you testified that within perhaps a year and a half there would be an excess of gas in the Blanco field?

A Within, if the present drilling rate continues and assuming that the average deliverability of the wells which are producing is representative, we should have an excess capacity during the coming year.

Q Did you have any information as to proposed expansion of the pipe line companies, pipe lines up there of their additional need for gas in the Blanco area in making that determination?

A I was not able to get any of the information.

Q In other words, the idea that there would be an excess of gas in a year is purely a hypothetical case without taking into consideration the real thing as to what the needs will be for gas of the Blanco field and the proposed pipe line addition?

A The data which I have given is based on the present capacity as best I have -

Q (Interrupting) Without any expansion?

A Without any expansion if such is in the wind.

MR. DAVIS: That is all.

A VOICE: Are you familiar with the testimony previously given the Federal Power Commission with reference to the need for additional pipe line in the basin?

A No, sir, I have not had a chance to read you all of that.

Q (By MR. BARNES) I would like to ask you two more questions. You used the word deliverability several times. Isn't it true that the bulk of the drilling in that area has taken place in the last year or year and a half?

A I believe that is right.

Q * Much larger proportion of the wells completed in the last six months or previous year?

A I don't have any accurate figures on that. I know that production this year is greater than it has been in the past. It is shooting up rapidly.

Q Wouldn't it be true that a lot of deliverabilities on wells that have only been on the pipe line a short time, if in fact only too short a time to know what their actual deliverability will be?

A That is possibly true. I might point out that we expect our wells to clean up an increased deliverability as they continue to produce.

Q Do you have any concrete examples of that? Any specific wells you can mention that have done that?

A I don't have any specific examples. I believe that has occurred in one of our wells at least.

Q I would like to ask you one other question. You said there had been no decline in production of recent completions. Do you have any evidence of any decline in any completions up there at all? Let's take the original Mansfield's well. Has there been any decline in the production of that well since it was -

A (Interrupting) I don't believe I made that statement to begin with. I don't have any figure on decline of any single completion.

Q I may have misunderstood. I thought you stated there had been no decline in recent completions.

A I didn't state that, no, sir.

Q Well, let it go. I think if you will go back through the testimony, you did make that statement.

MR. SMITH: You mean decline in the number of completions per month?

MR. BARNES: I said there had been no decline in production in recent completions. Just a general statement. In any of the older wells. I don't have any concerning the decline of any single completion. I will let the record stand on that.

MR. BARNES: That is all.

MR. SPURRIER: Any further questions of this witness?

By MR. WHITE:

Q Has the bottom hole pressure decreased in any of the wells?

A I don't have any recent bottom hole pressures. Most of the production has been taken from the field during this year. We have noted practically no decline in bottom hole pressures of our own completions.

Q Of the 80 wells you speak of, how many are owned or operated by Stanolind?

A I believe we had two or possibly three on production during October.

MR. SPURRIER: What sort of test was this original potential that you took on these wells?

A We took back pressure tests on our own wells, particularly on Stanolind Elliott. I am not familiar with all the procedures used by the other operators in reporting their potential tests.

MR. SHEPARD: How many different operators are there in the Blanco?

A I don't have that figure. Let me see. Some 15 I think, 15 to 20.

Q Are there anymore questions, Mr. Barnes?

MR. BARNES: I don't want to beat this to death, but I would like to ask one more question.

Q (By MR. BARNES) This is an opinion question. In your opinion, do you believe that fixed core analysis in a field 48 miles long and 20 miles wide is sufficient to evaluate the decline of the potential of the entire area? Do you think you have a sufficient spread?

A As far as I am concerned, I don't think we do. But I haven't actually used the core analysis. But a preliminary estimate of the porosity and permeability in the formation -

Q (Interrupting) You don't think that is sufficient to compile any final figure on?

A I would like to have more -

MR. WHITE: (Interrupting) You said very few were taken

and I think you later stated 8 to 10. Can you point out on the map where the 10 cores were taken?

A No, sir. I don't have those locations in mind.

Q You don't know whether they were taken in the same area or diversified through the field?

A No, I don't. I think most of them were through the center portion of the field.

MR. GORHAM: I would like to ask, relative to interlocking reservoirs in the Blanco area, when wells have been shut down to the surface with an adjacent well's produce, has there been any decrease showing any inter-locking capacity?

A So far as I know there have been no tests of that nature. It would require considerable amount of production from an offset well in a field of this size before any pressure would be noted on a shut-in well. You are going to have to produce a lot of gas from the rese voir in order to pull the pressure down any.

MR. SPURRIER: You represent Southern Union Gas Company? I wish you would give your name and who you represent.

Q You testified that during the month of October, 80 wells produced an average of 591,000 feet a day. And it was your opinion that the wells would continue to produce at that rate, is that right?

A I testified that I was assuming that those wells were

representative of the additional completions which we will be making.

Q Are you aware that during the month of October a large majority of the wells had not produced into the line long enough to have stabilized in their flow and that it takes several months for any of those wells to become stabilized into the pipe line?

A That is possible.

MR. SPURRIER: Any one else?

MR. LOCKE: Do you know how many wells are actually producing into the line in October?

A From the figures which I obtained from the New Mexico Oil and Gas Engineering Committee, there were 80.

Q How many of those did Southern Union have?

A I don't know.

Q How many were producing into the El Paso pipe line?

A I don't have that location.

Q Do you know the location of the wells producing into the lines?

A I don't have it with me. It is reported to New Mexico Engineering Committee. That is where I got the information.

MR. WHITE: When was the first well drilled in this field?

A I believe the first well was completed in 1927 or 1928. That was the well which is now the Delhi No. 1,

~~With a~~ Mansfield.

Q Can you give us the number of wells that were drilled, say, within the first ten years, and how many in the last few years, say, within the last year?

A I don't have that information with me, sir. Most of the wells I believe have been drilled since the first of 1948.

Q You say most of the wells. How many would you say?

A I think there was one well producing until 1948.

Q Then approximately 79 of the wells have been drilled since 1948?

A That is right.

MR. SMITH: Do you know how long the 25 rigs have been running out there?

A The only figures I checked in that respect were for the last three or four months of this year.

MR. UTZ: Mr. Muss, getting back to your back pressure tests. How many wells did you back pressure test, can you give me that figure?

A I don't have it with me. I know that we have taken back pressure tests on two of the wells.

Q Were they four point tests?

A Yes, sir, four point tests.

Q You are able to get a reasonable four point test on them?

A I wasn't entirely satisfied with it, no, sir. They take a long time to stabilize.

MR. SPURRIER: Any one else?

MR. SHEPARD: This first well that was drilled, has there been any recent test on it?

A If there has been it hasn't been in a form where I could find it.

MR. SPURRIER: Mr. Barnes, will give you just one more chance if you want it.

MR. BARNES: I don't want another chance, I wasn't going to ask a question merely as a matter of record. I checked the State Oil Commission records on the basis of the actual records turned into them, I found at the end of October, 92 wells were on the line in the Blanco field of which 48 were Southern Union, and 44 were El Paso. I just want to enter that in opposition to a previous figure.

MR. SPURRIER: Thank you. Any one else? The witness is excused.

(Witness excused.)

LEWIS BOND,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. SMITH:

MR. SMITH: I believe he has testified before and you have accepted his qualifications.

MR. SPURRIER: That is right.

Q (By MR. SMITH) State your name.

A Lewis Bond.

Q By whom are you employed?

A Stanolind Oil and Gas Company.

Q Mr. Bond, how many purchasers of gas are there in the Blanco Mesaverde Pool?

A Two. The Southern Union and El Paso Companies.

Q Do you have any exhibits that show the ultimate market for gas purchased by the two companies?

A Yes, I do.

(Marked Exhibit No. 7 for identification.) 7

Q Will you please state what those markets are?

A This map shows major gas pipe lines in the United States. It is of interest in this regard to Blanco area since it shows the market served by the Southern Union and El Paso lines. The Southern line serves towns in New Mexico such as Santa Fe, Albuquerque, Los Alamos, and Durango in Colorado. The El Paso line serves markets chiefly in Arizona and connect with the Pacific Gas and Electric Company line which I believe ultimately transports that gas to San Francisco.

Q Do you have an exhibit showing the location of the gathering lines of El Paso and Southern Union in the Blanco Mesaverde Pool?

A Yes, sir.

(Marked Exhibit No. 8 for identification.)

Q I note that you have different colored lines in there. Will you please explain which colors are which companies lines?

A First I would like to state that the orange border indicates the present boundaries of the Blanco Mesaverde Pool. The lines colored in red indicate pipe lines operated by El Paso Natural Gas Company. The lines indicated in green are operated by Southern Union Gas Company. This area is the Fulcher-Kutz Pool which produces across from the Pictured Cliffs and is not involved in this hearing. I would like to state that the information which I have on the Southern Union line, I believe is current as of last March 1951, and the El Paso lines as of October. So I feel sure that there are numerous other lines which have been completed since these transitions were prepared. The dotted lines on this map indicate proposed lines, many of which I am sure are in place at the present time. I would like to point out further that the old La Plata area is served by the Southern Union Company. The Largo area to the south served by the El Paso Company. And in the central portion of the pool which is the area where the Blanco Pool was first discovered is served by both lines. I have colored in that area served by both lines, acreage which is connected to each line. The blue color represents acreage connected to

El Paso lines and the yellow to the Southern Union lines. I would like to explain that this legend which indicates that yellow is dedicated to Southern and blue acreage dedicated to El Paso's line is not intended to imply that is the only acreage so dedicated. I have merely colored it in, the central portion, to illustrate a point. My point is this. You will note from the colored blocks that acreage served by the El Paso line is in more or less of a checkerboard pattern with acreage served by Southern Union. In other words, there are offsetting tracts served by both lines in that area. I feel sure that that condition exists in other parts of the field and will exist in a considerably larger portion. Since the acreage served by the two lines is in close conjunction, it appears to me that unless the withdrawals from both lines are approximately the same percentage as deliverability of the wells that they are connected to, that some inequities will result to the royalty owners and lease owners of the acreage involved.

Q We have proposed certain rules with respect to that feature. Would you like to explain the proposed rules that we have?

A Yes.

Q That we have suggested to the Commission.

A Yes, sir. I have several copies of these and perhaps the Commission would like to look them over at the same time.

I would like to state before reviewing the rules themselves that we have discussed the rules with other operators in the Pool and have included suggestions made by various operators. The proportion of the rules commenced with Paragraph A. I will begin discussing the rules. On the first page, we have merely prepared a proposed form of order for the convenience of the Commission in considering this matter. I would like to point out two corrections which may be made on some of the copies which have been circulated, and not on others. Where reference is made to Order 799, the reference should be to Order No. R-110, which is the most recent order promulgating rule for the Blanco Mesaverde Pool. Going to Paragraph A, on Page 2, where the actual mechanics of prorating gas are outlined, that paragraph provides that the production from wells in the Blanco Mesaverde is to be determined by nominations which are submitted by the purchasers of gas in the pool, on yearly basis. It also provides that the Commission may consider previous over and under productions in arriving at the actual allowable from the nominations submitted. That provision is to enable the Commission to add previous over production to the nominations or subtract previous under production in order that the purchasers may produce the amount of gas which they require and still make up previous over or

under production.

This paragraph also provides that the purchasers may submit amended nominations at such time as it becomes obvious that their nominations have not adequately reflected their market for gas. In Paragraph B there is a provision for allocating the allowable established by the Commission for the first year, or rather I should say from the effective date of this order to January 1953, on the basis of the open flow potential tests which have been taken on the wells.

In Paragraph C, it is provided that after January 1, 1953 gas in the pool shall be allocated on the basis of acreage times deliverability. In other words, each well will get a share of the total pools allowable which is in proportion to the product of the acreage assigned that well and the deliverability of that well to the summation of the product of these factors as to all the wells in the pool. It has an additional paragraph, or rather an additional feature which provides that low capacity wells which are recognized by the operator as not being able to produce their assign allowable may be assigned a lesser allowable at that operators request. It also provides that the Commission may set a minimum allowable which may be produced by any well whose allowable is calculated by the formula that we have outlined, is considered to be

unreasonably low. We haven't made any suggestion as to that minimum figure since we believe that actual schedules probably should be computed before enough information will be available to recognize what a fair figure should be.

Paragraph D defined deliverability as indicated capacity of the wells to produce against a stipulated pressure as determined by tests to be approved by the Commission. It is our thought that before January 1, 1953, at which time the deliverability feature of the rules would become effective, if the rules were approved, that tests can be taken and studies can be given to the actual manner of conducting deliverability tests. We thought that perhaps if sufficient data was available at the present time to actually outline a deliverability test which would be satisfactory at this time.

Paragraph E provides for the taking of deliverability tests on all wells during the period to be set by the Commission and during the same period each year thereafter.

Paragraph F provides for a balancing date for the purpose of computing and of balancing over and under production. It also establishes balancing periods of twelve months duration. The periods are to begin at 7 o'clock a. m., January 1 of each year and end as of the same time each following year.

Paragraph G provides that wells in the Blanco Pool

may be produced in excess of their assigned allowable provided that any well which is over produced as of a balancing day in which it was over produced on the previous balancing date, must be shut in until the over production is made up.

Paragraph H provides for the carrying forward of the under production from one balancing period to the next. It also has a provision that cumulatively under produced on two successive balancing periods, shall have the under production for the second previous balancing period cancelled. Another provision on Paragraph H is that wells which are cumulatively under produced on two successive balancing dates due to lack of ability to produce will not have an allowable assigned greater than their average production during the preceding balancing period.

Paragraph I provides for the issuance of a proration schedule by the Commission by January 20th of each year showing the allowable assigned each well for the year, and during subsequent years the schedule would also show the over production charged against each well or the under production which is credited to that well for allowable purposes.

Paragraph J merely provides for suitable reports to be submitted to the Commission to carry out its duties in respect to this suggested order.

Q Mr. Bond, in your opinion, as an engineer, from the standpoint of protection against withdrawals from one tract to another, in view of this situation as exemplified by Stanolind's Exhibit 8, do you consider the rules to afford the best possible protection against such inequitable withdrawals?

A I believe the rules as designed will protect equities, protect operators against inequitable withdrawals, I should say.

Q Do you have any information on the respective market demand of this company's purchasing in the Blanco Mesaverde Pool?

A No, sir, I have not.

MR. SMITH: I have no further questions.

MR. SPURRIER: Does anyone else have a question?

MR. LOCKE: Do you have any communitization between any of the areas set out in the two different colors?

A I have no interference test or direct knowledge such as would be acquired.

MR. LOCKE: Do you have any interference tests?

A I think that fact that the Commission has recognized that area as one pool and has found that 320 acres units are a desirable development pattern would indicate that there will be communitization between wells located on those tracts.

Q (By MR. LOCKE) But the Commission has not so found that there is communication has it?

A Not directly. I believe their establishment of proration units would carry that imprint.

Q But all you have is conjecture but there might be at some future date communitization?

A Yes, I can't definitely state there is at this time. In my opinion there certainly will be.

Q You say certain operators suggested these rules. Name the operators who participated in these suggestions.

A Delhi Oil Corporation, Southern Union, El Paso, Stanolind, and I believe have all made certain suggestions to the rules.

Q None of the interested operators participated then?

A I don't know what your definition is.

Q I mean a smaller company, not one of the major.

A If the companies I named are major, no, sir, they did not.

MR. DAVIS: Just in answering Mr. Locke's question, I didn't understand you, I don't understand. Do you mean that Southern Union has recommended -

A (Interrupting) No, sir, I don't mean to say that the companies I named are advocating the rules that I have presented. I do mean that they have suggested if rules are issued, certain desirable features to be included.

Q (By MR. DAVIS) Has Southern Union ever suggested or recommended that proration rules be pool-wide?

A No, sir, not to my knowledge.

Q Your proration order is predicated upon prevention of waste and production of correlative rights, is it not?

A Yes, sir.

Q You are familiar with the definition in the Oil Conservation Act of what constitutes waste?

A More or less, yes.

Q Do you know of any present waste in the Blanco La Plata Mesaverde Pool at the present time?

A No, sir, I don't know of any waste.

Q In other words, is it true that the proposed proration order is something for future, might be five years it might be two years and then again it might never happen?

A I can't agree with that statement entirely, Mr. Davis. You mentioned that our order was predicated on waste and protection of correlative rights.

Q And, or?

A And, or. Our rules as proposed, actually would tend to protect correlative rights at the present time.

Q Do you have any evidence that correlative rights are not being protected?

A In answer to that, I will just say this. At the present time, if a well is shut-in for any reason such as mechanical

difficulties or perhaps a well is frozen up during cold weather, which I understand is not unusual in that area, under the present conditions that would result in a loss of production to the operator of that well. If our rules were in effect, that well would accumulate under production which could be produced at a later time and the operator and royalty owner holding interest under that tract would be protected. Correlative rights, I think, will be protected even more in the future since I believe that the supply of gas in this area is going to exceed the capacity of the lines. And at such time, I think there will definitely be a need for an equitable method of allocating the gas to the various wells in the pool.

Q You referred to in the future. That would mean, that is rather indefinite as to what the future would hold.

A Well, based as Mr. Nuss testified, based on the present capacities, it appears that that situation will be reached during the next year.

Q But Mr. Nuss didn't have full and complete information as to pipe line additions and, or the quantities of gas expected to be withdrawn from that area during the next few years.

A No, sir, he did not.

Q Let me ask you one other question. You say here that protection of correlative rights and protection is not

contemplated by the statutes. That proration will be put into effect when there is an actual waste or correlative rights -

A (Interrupting) I think that is a legal question.

MR. SMITH: I think he is asking him a legal question. I don't think the witness is qualified to answer it.

MR. SPURRIER: You present that as an objection?

MR. SMITH: I think it is an objection and it is argumentative and it is within the sphere of the witness.

MR. SPURRIER: Objection sustained.

MR. THOMPSON: Now asking, Van Thompson, Southern Union.

Q (By MR. THOMPSON) Mr. Muss testified that based on the core analysis, the average permeability was varied between .55 and 1.4, which is considerably, very very low for permeability. I would like to ask you in your opinion, do you think one well with a permeability like that will drain more than 320 acres?

A My opinion is that it will, yes.

Q In what length of time do you think it will take to do it?

A I couldn't make an offhand estimate.

Q (By MR. DAVIS) Do you know of any wells there that have not been connected when requested to do so?

A No, sir, I don't.

MR. SPURRIER: Anyone else have a question?

MR. BARNES: I would like to bring out a point.

Q (By MR. BARNES) Do you know at the present time of any single well in northwestern New Mexico, any single well standing by, unable to connect to a line because there is an over production of gas and over abundance of gas in the area and they can't put it on the line?

A No, I don't have any knowledge of any well like that.

Q I would like to point out, you have made the statement here and you also have it in your proposed order, that each operator shall have a right over like periods to make up any deficiency in his rateable share. Under H, it states here, any well which is under produced has, of a balancing date, may carry forward such under production as allowable credit to be produced during the next balancing period. I would like to point out that the production of the wells up there at the present time are based on two factors. One is the reservoir condition under the individual wells which of course, is an index of its permeability and porosity and the ability of the well to drain a particular area effectively. The second factor is the ability of that particular well to button the pipe line pressures and there are a great many wells up there in their deliverability which can't deliver more than about two to three hundred thousand cubic feet of gas, and some

wells will deliver three or four million. Those are just general figures, anyone can check and find them pretty nearly correct. I don't believe wells shut in over a period of time and not allowed to make the gas over a period, could make the gas up.

MR. SMITH: Is this a question or are you offering testimony? If it is, I would like -

Q Do you believe under that situation that the wells could ever make up that gas?

A Some wells, Mr. Barnes, due to their limited capacity obviously would never be able to make up under production which was due to allowable assigned in excess of their capacity. Other wells which might have mechanical troubles, failed to produce for other reasons, could make up such under production. Perhaps a well could be worked over in some fashion and its producing ability increased in that case it could make up previous under production.

MR. SPURRIER: Any further questions?

MR. WHITE: Do you know how many wells have been brought in within the last year?

A No, sir, I think Mr. Nuss had some figures on that but I don't recall exactly what they were.

MR. SPURRIER: Do you want Mr. Nuss to answer the question?

MR. SMITH: No, he testified that there were 79 brought

in since 1948 as I recall.

MR. SPTH: We will get the figures for you.

MR. SMITH: My recollection was that he testified there was something like 144 wells completed out there.

MR. SPURRIER: In the interest of time and for the record, does anyone know how many wells have been completed in the past year? I presume you mean the first months of 1951.

MR. SMITH: I don't believe we have any data on the annual, what wells were completed during this current year. We only have information on the total number of completions out in the field.

MR. SPURRIER: Does anyone have any further questions?

MR. FOSTER: May I ask one more question?

MR. SPURRIER: Judge Foster.

Q (By MR. FOSTER) Perhaps I am way behind on this thing. There has been some other hearings had and I don't know what the record reflects. But apparently, Mr. Bond, you now have in mind some means of implementing the general rules you have set out here, or you have already placed those means of implementation in the record. Such as, how are you going to determine the back pressure and slope off your curb and so forth.

A Judge Foster, as I mentioned, perhaps I didn't discuss it fully a while ago. We haven't recommended a back pressure

for a deliverability test. It is our thought that an actual deliverability test against a line pressure to be determined would be the most accurate method of comparing the producing capacity of the well. In an actual deliverability test like that, of course, there will be no line or slope or any computation to it. It will be an actual test. The reason that we did not recommend the mechanics of taking the test at this time was that we wanted to have time to make more tests in the field and give that more study before recommending tests to the Commission.

Q Well now, you have in mind some back pressure on which your deliverability is to be determined?

A Well, offhand it was our thought that a back pressure in the neighborhood of the actual working pressures of the lines would be most desirable.

Q Do you have in mind a constant or variable back pressure?

A Constant for a certain length of time at least. It might be necessary in the future years as the producing ability of the wells decreases to establish another back pressure that the wells do produce against.

Q Do you mean that you have in mind 500 pounds for one pipe line and 300 pounds for another?

A No, sir, I didn't mean that.

Q At this time do you have any evidence that the deliverability or whatever you have in mind on that, is proportional to the gas reserve per acreage?

A I think that our formula which is acreage times deliverability has a correlation with reservation, yes, sir.

Q Of course, that assumes a lot of other facts does it not?

A Yes, that is right.

Q Those facts that you are assuming in making that answer are those matters of records in hearings that have been had heretofore?

A Well, I would say this, Judge Foster, I can't think of any pool offhand that in my mind deliverability, I am speaking of gas pools deliverability and acreage, wouldn't have some relation to the reserve.

Q Well proportionately only with respect to the manner in which it might determine deliverability?

A I would say, I would state further that I believe the testimony which Mr. Nuss has put in includes some of the factors that would have to be considered. I believe it is part of the record, yes.

Q What flow period do you have in mind in determining the deliverability of the wells?

A I haven't any flow period in mind at the present time.

Q Well that is necessary isn't it?

A Yes, but as I explained, it is my thought that will be considered by the Commission at a later date.

Q Don't you have in mind something that you might suggest to the Commission?

A No, sir, I do not.

Q You do not.

MR. SMITH: Mr. Bond, it will not be a factor until after 1953, isn't that correct?

A That is correct.

Q (By MR. FOSTER) What you are saying is that depending upon what the reservoir condition may be beginning in 1953 might determine what you suggest as a flow period?

A That might have something to do with it, yes.

Q Up until 1953, your proposition is just prorated on a straight potential basis?

A Yes, sir.

Q That is not a matter of sound engineering, but just one of expediency, isn't it?

A I didn't understand the question.

Q You are suggesting for prorating up until January 1, 1953, on the basis of just potential, isn't any sound engineering question, it is just a matter of expediency?

A Well, I don't think that it is unsound engineering, Judge Foster. If we had deliverability tests on all the

wells at this time it would be my recommendation that we institute our acreage times deliverability formula at the beginning of these rules.

Q I am talking about your suggestion just to prorate on a potential period for a period of one year.

A Yes.

Q I am saying that suggestion rests more on a matter of expediency than it does on sound engineering principles.

MR. SMITH: I am inclined to think that the question is argumentative, or have him amplify what he means by expediency.

Q All I am saying is, and he told me that it was his desire to prorate gas somewhat on the basis of reservation in place. If you will pardon me for doing a little Dr. Jekyll and Mr. Hyde, turning from lawyer and engineer, I know you can't do that on a basis of straight potential. That is all I am getting at. It is a matter of expediency for the first year that you suggest that you prorate it on a basis of straight potential rather than on the basis of any sound engineering principles.

MR. SMITH: I see your point.

A If you understand the question, I don't think that prorating on the basis of potential tests is unsound, especially for the period of time required to obtain better tests. I don't think that any drastic, let me put

it this way, I don't think inequities will occur as a result of that, Judge Foster.

Q You mean over a years period, period of one year?

A Over a years period at least.

Q Over a longer period, you think it would?

A I would prefer acreage times deliverability.

Q Because that is better than straight potential?

A Yes, sir.

Q That is what I am saying. So really the basis of your suggestion is simply one of expediency rather than sound engineering principles?

A I can't go along with you entirely on the statement, no, sir.

MR. SMITH: Based on present information from the field out there, is it not - wouldn't it not be considered sound engineering to use a potential test until such information or data is available upon which your deliverability times acreage can be determined?

A I believe it is as sound a method as is available to us.

Q (By MR. FOSTER) You mean working with what you got, that is the best you can do?

A Yes.

Q That is a matter of expediency.

MR. FOSTER: That is all. One other question with the

acreage unit you have in mind, some maximum acreage unit to be used in the field, don't you?

A Yes, sir, we didn't put any figures in I think that would be at the discretion of the Commission. I don't believe they would allow acreage greatly in excess of the 320 acre drilling units to be applied for allowable credit.

Q (By MR. FOSTER) When it comes around your time to suggest, you mean you are going to suggest 320 acres as a maximum unit?

A No, sir, I didn't say that.

Q Well, do you say that?

A No, I say that would be a matter for the Commission.

Q For the Commission to make up its mind, based on the testimony, what would be your suggestion?

A The Commission has allowed permits to drill in the Blanco Pool. I am sure on tracts that are not 320 acres. I haven't submitted any testimony to them to assist them in that matter. I think they could reach a decision.

Q What do you have in mind suggesting to them as a Maximum?

A I don't know whether I will make any such suggestions at all.

MR. SMITH: I started to suggest that, Judge Foster is asking the witness to give what he may testify to in the future. I consider the question improper and object

to it.

MR. FOSTER: I assumed that he comes in and suggests a formula. I am sure he must have had some acreage factor in while otherwise he is running loose. I am trying to find out what the acreage factor the witness has in mind is.

MR. SMITH: The present field route provides for 320 acre units.

A Yes, they do.

MR. SMITH: It is based on the 320 acres?

A Yes, that is correct.

MR. FOSTER: Does that mean that he now has in mind the 320 acres?

MR. SMITH: I don't know what he has in mind.

MR. FOSTER: You didn't answer the question for me. You didn't give me any information.

MR. SPURRIER: Gentlemen, at the risk of cutting someone off here let's recess until 1:30.

(Recess)

MR. SPURRIER: The meeting will come to order and we will proceed with Mr. Bond on the stand, please.

MR. SMITH: May it please the Commission, before I forget it, I don't believe I have introduced in the evidence all the exhibits we have. I would like to do that at this time.

MR. SPURRIER: They will be accepted. Dan Johnston, do you have a question?

MR. JOHNSTON: No questions, thank you, Mr. Spurrier.

MR. SPURRIER: Anyone else? If not the witness may be excused.

(Witness excused.)

MR. SMITH: That concludes the testimony which we have to offer, may it please the Commission.

MR. SPURRIER: Does anyone else have any testimony to offer?

MR. DAVIS: Yes, sir, we have.

VAN THOMPSON,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. DAVIS:

MR. DAVIS: I believe he has previously testified before the Commission.

MR. SPURRIER: That is correct.

MR. DAVIS: Are you satisfied with his qualifications as an expert?

MR. SPURRIER: Yes.

Q Will you please state your name?

A Van Thompson.

Q With whom are you employed?

A Southern Union Gas.

Q How long have you been employed with the Southern Union Gas Company?

A Since 1930.

Q Are you familiar with the production and operations of the gas wells in the Blanco Mesaverde Pool?

A Yes, sir.

Q Both from historical standpoint and present production also?

A Yes, sir.

Q First, Mr. Thompson, I would like to get the record clear as to our positions on proration of the Blanco Pool as a field-wide proration order. What is our position in that matter?

A We are opposed to it.

Q Going back a little bit on historical information from that area, I would like to ask you, do you know of any pool or area where there has been a pipe line constructed prior to the drilling of a well?

A No, sir.

Q Or obtaining production from a well?

A First you have got to have the gas wells before you can build a pipe line.

Q Does it not follow that once you get production, pipe lines are constructed and as an additional production is obtained additional pipe lines are constructed to take care

of the ability of the wells to produce?

A That is correct. As more wells are developed the pipe line system is expanded to take care of the additional gas capacity.

Q Mr. Thompson, there has been certain information in testimony here this morning to the effect that the present wells and those supposed to be drilled in the area will be either equal to or in excess of the pipe line capacity. Would you elaborate on that a little bit?

A First, the pipe line capacity in the area is far in excess of the capacity of the wells. As more wells are drilled, it will increase the capacity of our pipe line. At the present time there is a shortage of gas in the area to supply our markets and El Paso's also.

Q I believe it has already been testified to that our markets are primarily Santa Fe, Albuquerque and surrounding towns, including Los Alamos.

A That is right. It is within the State, except a small amount that goes up to Durango.

Q In your opinion, do you think that the present drilling program will be sufficient to take care of our needs to the pipe line connections that will get on a prorated basis?

A No, sir.

Q In other words, you think that we can use minimal wells than we have now connected to our pipe lines?

A That is right, our load is going at a rate of peak load of about twenty million feet per year and our old wells are declining at the rate of ten million feet per year. So that at our present requirements or about thirty million feet per day per year, increase.

Q Mr. Thompson, in connection with the proration, I would like to ask you if Southern Union participated to an extent in discussion of the proposed proration of gas up in this area prior to the filing of the applicants applications here?

A The first we heard of this proration order was after it had been filed.

Q In other words -

A (Interrupting) Later on we had, I think, we met with them one time and discussed it.

Q When did you have some information that it was a possibility, but we had no definite information of the present proposed order until after the application had been filed?

A That is right.

Q Did we make any suggestions at this conference or recommendations as to, if proration was needed what it should be?

A We recommended that if they had to have proration that it be put on a pipe line basis.

Q Isn't it true then, in effect, Southern Union presently is prorating its wells on a pipe line by pipe line basis, on the basis of deliverability?

A That is right.

Q Do you have any other suggestions or recommendations on this proration order?

A No, I don't believe so.

MR. DAVIS: I believe that is all we have.

MR. SPURRIER: That is all of the direct examination. Does anyone have a question of the witness?

MR. SMITH: As I understand it, your company has no objections to proration at this time?

A We object to proration on a pool-wide basis and we don't think that proration of any kind is necessary for several years to come. We think in effect that we are prorating already on a pipe line basis.

Q (By MR. SMITH) You stated that you consider the drilling program out there insufficient to supply your demands under proration. Do you have any statistics or figures on that to back up the statement?

A I didn't necessarily mean on proration, I meant on any kind of basis.

Q In other words, your present market demand is sufficient to take care of additional wells that are drilled out there even at the rate of 14 additional

wells per month?

A I think so, yes.

Q What is the capacity of your pipe line?

A The present capacity of the pipe line is on the order of 120 million feet per day.

Q There has been some testimony to the effect that it was forty five million. Did you or anyone in your company that you know of supply the figures to us at our request?

A No, sir. I will correct that a little bit. Lewis Bond ask me about ten o'clock if that one particular line had about that capacity and I said I think so.

Q Which line?

A The one line running into the Blanco, and I wasn't considering the other two lines coming in another place.

Q The one in the upper northwest corner?

A No, sir. I was talking about this particular line here in addition to that, we have this line here and we also have a line which you don't have on there, which runs up through here (indicating).

Q You have three lines altogether?

A That is right.

Q That capacity varies according to the pressure it receives?

A It varies according to the pressure, yes, sir, and

size of the pipe.

Q Size of the pipe. What is the pressure and size of the pipe reflected by the three different connections in there?

A These two upper ones vary between 300 and 500 pounds, depending on the season the line over there on the Blanco area varies from 500 to as much as 650.

Q They all feed into a common line down here?

A No, that isn't quite right. This particular line feeds through a compress or station and then goes into the main line. This line feeds directly into the main line.

Q What is the pressure of this line here?

A At the present time, 650.

Q You state that the capacity is 120 million, that is based on what pressure figures?

A That is the capacity of this particular line here, which has all these feeder lines coming into it. At the present time we are increasing this line and putting in 15 miles of 20 inch right in here, and next year we have substantial additional improvements planned.

Q When will that completion program be finished?

A I don't think it will ever be finished.

Q You contemplate continuing to this, the size of this line, so that you can take the gas up there, the gas that

is available?

A That is right.

Q Wouldn't that be controlled by the market demand?

A That is right.

Q What markets do you have?

A Just the local Albuquerque, Santa Fe, Los Alamos, this particular area.

Q Do you have any economic figures on what the saturation point may be in those areas?

A No, sir.

Q You don't know whether it would require as much as 120 million?

A Yes, we know it will require more than that this very year. This year we have had already, we have had to interrupt all of our industrial costumers, the power plants and railroad shops, because we didn't have enough gas to supply.

Q How much are you supplying now?

A Today we are running between 80 and 100 million a day.

Q Are you familiar with the pipe line capacity of El Paso?

A No, sir.

Q What other gas field are you producing from besides Blanco?

A We are producing from Kutz Canyon field and also Barker Dome.

Q Your figures on market demandtake that production into consideration?

A Yes.

Q 80 to 100 million would include production from those fields?

A Yes.

Q What do you estimate your production that you are not taking from the Blanco field to be?

A We are taking it on the order of 20 million feet per day.

Q That is all the connected wells that you have?

A All the connected wells that we have tied to the pipe line, that is all they will produce into our pipe line.

MR. DAVIS: Mr. Chairman, one more question I failed to bring out but I do want the record to be straight on this. Has Southern Union ever refused a connection with either of the areas we have talked about in addition to the Blanco field? Are we always in the market for gas?

A Yes, sir.

MR. DAVIS: That is all.

MR. SPURRIER: Mr. Thompson, do you know what your average daily take would be for this year?

A No, I can tell you on an annual basis. It will be about 18 million feet for the year 1951.

MR. SPURRIER: 18 million.

A 18 million feet, yes, sir.

MR. SPURRIER: Any other questions?

Q (By MR. SPURRIER) Mr. Thompson, do you know what the deliverability of the combined wells in the Blanco Pool might be at this time?

A No. I don't have any exact figures as to the number of wells we have connected, but I believe it is on the order of 50 and from that 50 we are getting about 20 million feet per day.

Q From 48, I think the figure is 48, from 48 wells how much gas?

A 20 million feet per day.

Q We are speaking of Blanco now as a pool.

A That is right.

MR. SPURRIER: Anyone else? Mr. Smith?

MR. SMITH: I am just a little confused as to respective capacity of the feeder lines. What is the capacity of this line?

MR. SPURRIER: That is the La Plata end of the Blanco Pool.

MR. SMITH: In the northwest corner of the Blanco Pool.

A That is dependent on quite a few things, Mr. Smith. One of them is this, one particular line comes all the way down from the storage project here. The storage project is feeding and this line is feeding and this line is feeding,

all feeding into one common line. That particular line has a total capacity of about 30 million feet per day. At the present time we are running anywhere from 7 to as much as 10 million feet a day out of this area. We have just completed this line and we are, it varies 4 or 5 million feet a day. That isn't the capacity of the line. It happens to be there is a bottleneck in the system right here which we had planned to fix with 12 inch pipe down to the compressor station. We haven't got the pipe yet and it won't be done until later in the winter.

Q What is the capacity of the line northwest of Blanco down to the main line that you say comes from the storage project?

A You mean from up here?

Q That is right.

A I would say that particular line has a potential capacity of 40 or 50 million feet a day.

Q What is the size of the line?

A 10 inch.

Q Pressure?

A Varies between 300 and 500.

Q How much do you bring out of your storage project?

A We bring a peak out of there about 12 million feet.

Q Is that altogether during the winter months?

A We only used that storage project on peak days, cases

of emergency.

Q Let's pass to the new line that you have drawn on here in black pencil with which lies midway between the middle Blanco area and northwest Blanco area. What is the capacity of that line?

A The potential capacity of that line would be roughly 30 or 40 million feet per day. The reason we can't take it out is because we don't have the wells connected to it to do it. It was built much larger than the present wells anticipated we would get more.

Q With reference to the middle Blanco, what is the capacity of that line?

A That line is 12 inch, and it has a potential capacity without any additional compressor, or without any compressor, 40 or 45 million a day.

Q That is just to serve the middle Blanco area?

A That is right.

Q Do you have any construction plans to increase the size of that?

A Not at the present time because we are only getting 10 million feet a day out of it.

MR. SMITH: That is all.

By MR. UTZ:

Q You spoke of a location to pipe line or proration pipe line, proration on the basis of deliverability. Would you

clarify what you mean by deliverability?

A What I mean by that was that all the wells in a particular area feed into the pipe line wide open at the well and the only limit to the capacity of the well is the amount they will put into the pipe line.

Q Wide open?

A That is right.

Q Under what kind of back pressure?

A As I explained before, it varies from 300, five places, up to 650 pounds, different parts of the field.

MR. UTZ: That is all I have.

MR. SPURRIER: Anyone else? You may be excused, Mr. Thompson.

(Witness excused.)

MR. SPURRIER: Anyone else have any testimony to present in this case? If not we have some letter to read into the record. We will ask your indulgence since we would like them to appear in the record.

MR. WHITE: Here is a letter from Thomas J. Quigley, Beverly Hills, California dated December 15, 1951.

Gentlemen: The writer was one of the earliest operators in the area above described and is still the owner of royalties and leases and operating interests in several thousand acres in the area.

Long before Mr. Florance drilled the first well which

really opened up that Blanco Mesaverde area, the writer endeavored to interest Stanolind as well as many other companies in prospecting the Blanco Largo Canyon area and turned over some of his land to Mr. Florance in an effort to get the area drilled. So my associates and I are thoroughly familiar with the area, having practically pioneered it.

We have given the matter considerable study and are convinced that proration at this time is ridiculous and would discourage considerable drilling.

I am just in receipt of a letter from one of the largest companies in the United States which is now actively operating in the San Juan basin. I brought them in, personally, after considerable effort and they are now developing some of my lands. They have already drilled a couple of wells on my land and I wrote them ten days ago, asking them about their development plans for 1952 and I quote from a letter received from them just yesterday:

"We understand that plans are afoot for proration and one of the companies interested in that area has applied for proration of production.

Our future development will depend somewhat on developments as to market and price and the results of efforts to prorate production."

Here is concrete evidence that even the thought of

proration has immediately slowed up development. There is no question about its harmful effect upon the Basin at this time.

We sincerely trust you will reject Stanolind's application. Signed T. J. Quigley".

Here is a telegram received from Lawrence C. Kelly, Los Angeles, California, dated December 17, 1951:

"Stanolind petition for gas proration is so meager and lacking in working details that no consideration should be given it Stop I am holder of several federal leases in Blanco area and am interested in two Point Lookout gas wells I respectfully suggest much detail study and many formulae be worked out before considering any method of proration Stop As a member of Conservation Committee of California Oil Producers for more than fifteen years until 1948 I saw great number of formulae which appeared fair in principal worked out before using bring out fantastic results with many gross inequities Stop Many factors must be given weight namely pressures of different formations, economics cost of wells, gas gathering line pressures, government limitations of royalties and many others Stop Proration of gas production does not appear warranted for many years but if added to present high gas line pressures the incentive to drill gas wells is gone Stop Would be great set back to San Juan Basin I am unalterably opposed

to Stanolind petition. Signed Lawrence C. Kelly."

Here is a telegram from Sunray Oil Corporation, Tulsa, Oklahoma, dated December 17, 1951:

"RE: Case Number 330, December 18, 1951 Stanolind application to make more definite and certain rules applicable to Blanco-Mesaverde gas field, San Juan County

This company normally favors adoption of rules providing for equitable gas allocation where sufficient production and reservoir information is available. We have two wells on approximately 6700 acres in Blanco field and therefore in absence of such information have no recommendations to make at this time. Sunray Oil Corporation - William L. Horner, Chief Engineer."

Here is a letter from William Mansfield, Farmington, New Mexico, dated December 15, 1951, regarding proration of natural gas.

"To Whom it May Concern: The proration should cover all gas wells regardless of the formation the wells are producing from or from any formation that is not producing from at any time, that become productive at any time hereafter.

All gas wells regardless of size should be given an equal basis, (not an equal percentage basis), and this proviso should continue permanently until the smaller wells are producing their capacity, through the same size tubing

used in all wells, and at this time if the market demand is greater than the smaller wells can produce, the larger wells should be allowed to produce the over amount of the market demand.

In regards to differential governing gas wells that deliver gas into different main liner gas pipe lines, there should not be any difference of proration, unless it is necessary to reduce overhead operations, and in this event the average per well per year, should be adjusted during not over one year.

The State of New Mexico, and the Department of the Interior of the United States or its field agents, should employ experienced gas engineers on a permanent basis, to check all wells, and equipment used in the measurement and deliverability of gas produced, and delivered into all pipe lines regardless of ownership of the wells. The engineers employed for this work shall make daily reports on a monthly basis, to their respective superiors and their respective superiors shall adjust any discrepancies found, within a period of 30 days after such faults are found.

If there is not a sufficient income being paid to the state and government agencies who have the jurisdiction over the departments regularly assigned to administer these problems, then the amount of tax being paid to these

agencies should be increased a sufficient amount to properly take care of the work of the engineers and necessary assistants. Signed William Mansfield."

MR. SPURRIER: Does anyone have any further comment?

MR. DAVIS: I would like to make a statement. Southern Union believes that the Oil Conservation Act contemplates proration only in the event of present waste or a destruction of correlative rights. We do not believe that Stanolind has shown that any of that exists in the Blanco Pool and practically all of their testimony has been what might happen in the future. In view of those circumstances, we recommend that the application for proration of the Blanco Pool at this time be denied.

MR. SMITH: Well naturally, we want to support our application. I think our exhibits that we have introduced as well as the testimony amply support the application for proration at this time. The time to keep your horse from being stolen is before it is stolen. If we believe before the inequities do develop and try to rush into a manner of proration which may afford recompense it is impossible to make adjustments that would protect the people. We are suggesting a system of proration which I think has been misunderstood,

particularly in view of some of the letters read into the record. We are not attempting to think of it. We would result in limiting the market demand or amount of gas taken from the field. We are merely suggesting that consideration be given by the Commission to putting out such rules as will afford an equitable tactically in the area colored on Exhibit 8 as in yellow and blue, it is obvious in there that if one of the purchasing companies should take an excessive amount of gas to supply their particular market demand for a period of two or three years or even longer, that an imbalance will occur. It is self evident because you have off-setting leases dedicated to different purchasing companies. Now, if we wait until that time does come about, we have damage which cannot be measured because it is difficult to ascertain precisely how much damage may have occurred. So that we are suggesting at the time to put proration in before the damage occurs and we think that at the present, damage to correlative rights has been demonstrated through the fact that a number of wells may be shut in and frozen in and not given an opportunity to deliver their proportionate part of the gas to satisfy the appropriate market demand. You will note in our suggested rule that we have, go on a bottom hole pressure, or rather a potential test basis which is in affect

deliverability, because the company out there will take from these wells what they can during the first year. I think this first year, during that period of time, the Commission will have a chance to see how proration works out there and can definitely formulate a fair policy for all the people concerned, both purchasers and producers at the time and before there will be a possibility of waste or damage to the respective producing leases.

It is difficult of course, to express exactly what this damage may be, and it is very essential by its very difficulty we think that the time to institute rules which you know will set up a fair and equitable formula is, instead of leaving it to chance, to determine whether a rule should go into effect. In other words, what I am saying is that if it gets to a point where the imbalance does exist well then we will be confronted with the actual situation, with no past proration experience, no opportunity to determine how the wells will produce, whether it should be on a deliverability basis or test basis, we may have to spend months or years to determine what the productive capacity of the wells would be. And by that time, of course, the damage will be more or less aggravated. We think that protection of the royalty owners and the small operators in that field as to major companies demands that the proration rules be instituted now.

MR. SPURRIER: Did you, during your presentation of testimony, advocate proration by pipe line or on a pool-wide basis?

MR. SMITH: We feel that on a pool-wide basis is the equitable way to do it.

MR. LOCKE: I would like to make a statement, Mr. Spurrier. I want to say amen to every thing said by Southern Union as to conjecture quality of proof by Stanolind referring to the item of damage. I want to point out a real damage that will occur if proration is placed in the Basin in this year. Our companies commenced operation on August 1, 1951, on January 1, we will have three Pictured Cliffs and two Mesaverde tied into the pipe line. Our program is twenty wells in Largo Canyon. If this goes in, our capital, being risk capital, will not be available for the drilling of the wells. There is a real damage to the State of New Mexico in development of gas for markets in the San Juan Basin. It seems to me as a lawyer, that if I came in with a case so conjectural as has been presented here today that I would feel embarrassed to get up and contend that I should be given relief.

MR. SPURRIER: Anyone else? Mr. Stone.

MR. STONE: I represent Ralph A. Johnston. We have three wells, Mesaverde wells, in that red outline, and on

some 4000 acres. As an independent operator, we have not been consulted at any time, at least I have no reference of it in connection with proration. I think properly handled, and at the opportune time it is a wonderful thing. At this time it is neither practical or feasible. Also, on the basis of the testimony shown, I can find no inequities, no over production in gas and as far as the seller or producer of gas to contemplate what the purchaser would do toward taking it. I think it is far fetched. We are definitely oppposed to it.

MR. SPURRIER: Anyone else? Mr. Morrell.

MR. MORRELL: No statement, thank you.

MR. GORDON: With the Three States Natural Gas Company, we have five wells now completed and some of them would be in the immediate area affected. We contemplate drilling between seventy five and eighty wells. That is based, that program is based, on our confidence that the pipe line outlet to this field will be sufficient to take the production developed in the area. At this time we feel that proration as suggested is not required, but should any inequities develop, we will be glad to go into any proration that is proposed for the field in the future.

MR. SPURRIER: Thank you. Anyone else? Mr. Bolack.

MR. BOLACK: Mr. Chairman, I have interest in a number of gas wells in the Blanco field. Some of them are over-

rides. Some are half interest workings. I feel that proration at this time would definitely curtail considerable activity in that area. I won't say that the suggestion is wrong. I feel it is just a little bit ahead of schedule. I feel that their testimony stating that powerful line pressures are maintained in that area, I believe that wells producing against comparable line pressure will automatically prorate themselves as accurately as can be done mechanically. I would concur in practically all the statements of Southern Union. I oppose it.

MR. SPURRIER: Anyone else? Mr. Barnes.

MR. BARNES: Mr. Spurrier, I am representing Frank Barnes, an independent geologist, Mr. John Price, an associate of Aztec, and Mr. William Mansfield, of Farmington, and Kingsley-Locke Oil Company. I would like to state for the record that I am not personally opposed to proration as such or in principle, but that myself and my associates are opposed to proration at this particular time because we feel that it would damage development in the San Juan Basin and would result in the drilling of considerably numerous, numbers of gas reduced, numbers of gas wells over the next few years. I would like to make a suggestion to the Commission that this petition be denied and that in the present time the Commission appoint a Board to study this situation impartially and make a recommendation to the

Commission within the next six months on the feasibility of proration at that time.

MR. SPURRIER: Anyone else?

MR. RICHARDSON: I represent Lowry and Associates, and all I would like to say is to emphasize what Mr. Locke has said that I represent some independents, and we are not operating on the same scale as the Blanco is, although we have twelve rigs running. They have twenty five up there. We have got sixteen wells in the process of being drilled and hope to complete those in the next couple of months. The time just doesn't seem right to me to come in here with a proration order and result in quite a lot of development coming to a halt up there.

MR. SPURRIER: Anyone else? If not, if there is no further testimony, the case is concluded and will be taken under advisement.

(Whereupon the hearing was adjourned.)

STATE OF NEW MEXICO)
:
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of proceedings before the Oil Conservation Commission, State of New Mexico, at Santa Fe, in Case No. 330, is a true and correct record of the same to the best of my knowledge, skill and ability.

Dated at Albuquerque, New Mexico, this 19th day of January, 1952.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JAN 23 1952

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 330-330A Special Hearing

VOLUME II

130 through 238

June 22, 1954

TRANSCRIPT OF PROCEEDINGS

OFFICIAL RECORD
OIL CONSERVATION COMMISSION

ADA DEARNLEY AND ASSOCIATES
COURT REPORTERS
ROOMS 105, 106, 107 EL CORTEZ BUILDING
TELEPHONE 7-9546
ALBUQUERQUE, NEW MEXICO

I N D E X

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MORNING SESSION
June 22, 1954
Case 330-330A

MR. SPURRIER: The meeting will come to order please.

Mr. Reeves, I believe you were still on the stand. Does anyone have any further question of Mr. Reeves?

MR. MACEY: I want to ask him a question.

MR. LOCK: I would like to call up Case 729 having to do with the proration of gas in the other fields and made a motion concerning it. I would predicate my motion on these facts. I am advised that the ones are now prepared to go ahead with the hearing. I am further advised that the Commission itself is not at this time ready to go ahead with the hearing. In view of the deliverability, tests will not be completed until 8-31, that is August 31, of this year.

I now move that Case 729 be continued until the September meeting of the Commission.

MR. SPURRIER: Is there objection to Mr. Lock's motion on Case 729? Is there anyone who has testimony to present in Case 729? We will give you an answer on that after the first recess.

D. W. R E E V E S

having been previously duly sworn, testified further as follows:

By MR. MACEY:

Q Unfortunately I wasn't in the room when you were asked about the interference test. I wonder if you would try to bring me up-to-date on that.

A That was not directly taken as an interference test, but the information that was obtained, more or less, incidently, did indicate about the same results as you would have gotten from an interference test. Briefly, I pointed out that Pubco State No. 12 was shut in for 180 days after completion. Of course, we took the initial tubing pressure and casing pressures. Likewise Pubco State 13 was shut in for 120 days. I believe that yesterday I said 180

days for both, and then corrected it later, pointing out it was 180 for one and 120.

During that period there were seven offset wells prior to the time that the Pubco State 12 and 13 were placed on the line. Now, initially Pubco State 12 showed tubing pressure of 1,080 pounds, and at the end of 180, 1,078 pounds. Casing pressure on Pubco State 12 was 1100 pounds at the beginning, and 1100 pounds at the end. Pubco State 13 showed at the beginning a thousand and sixty pounds at the end, a thousand and sixty-four pounds tubing pressure. Casing pressure on 13 showed a thousand and seventy-seven at the beginning, a thousand and seventy-nine at the end. Which indicated to us that the production of the offset wells did not in any way reduce the pressure on 12 and 13, thus indicating there was no drainage occurring during that period.

If it is the pleasure of the Commission, I have a copy of the statement that I would be glad to furnish.

Q How did you determine your pressures, that is take them as a dead weight?

A I am not prepared to say whether it was taken with dead weight pressures or spring gauge. Mr. Maxwell, our production engineer in the field, tells me it was dead weight.

Q Did you, during that period of time, did you continuously take pressures on the well, or was it a matter of just taking the initial tubing pressure of 1,080 and 160 days later take another pressure and determine that it was 1078?

A Might I again ask the gentleman that supervised it?

(Discussion off the record.)

A Mr. Macey, I misread my data here and I would like to correct

that and also correct my statements on the previous day, that is that I made yesterday on this check. In other words, at the initial pressure which was a maximum, was 1,071 on 12 and was 986 on 13. That was at the end of fourteen days and eleven days after shut-in. At the end of 120 days the first figure I gave you was 1,080 tubing at 12, 1100 casing pressure on 12, and at the end of 180 days was a thousand and seventy-eight tubing, 1100 casing. In other words, sixty days later.

Now on 13 the initial maximum pressure at the time of I. P. was 986 pounds. At the end of ninety days that well showed tube pressure of 1,060, casing pressure, 1,077, and at the end of 120 days, tubing pressure of 1,064 and casing of 1,079 pounds. Those figures are correct. What I did in the first figures I gave you was omitted the pressure at the time of I.P.

MR. GREINER: Would you give us the pressure again under the initial one, please?

A All right. Pubco State 12 at the time of I.P. after fourteen days, was a maximum 1,071 pounds. At the end of 120 days tubing pressure was a thousand and eighty pounds.

MR. GREINER: We have that. The initial ones.

A I see. Pubco State 13 at the time of I.P. was 986 pounds. As I say, these figures were taken not for the purpose of shut-in in check or anything, but merely occurred because of delay in hooking up those two wells. The other wells, if you are interested, Mr. Macey, that were producing in the general area, I have those. There were seven offset wells at that time being produced.

MR. MACEY: I think that takes care of that little matter, Mr. Reeves. One other point I would like to know, you used a maximum

and minimum pressure of 1,114 and 933 I believe, on your range of possible reservoir pressure?

A I did, yes, sir. That was based upon the pressures at the time of initial potential, the initial check. Those were on Pubco wells. Now, I can give you those well numbers if you so desire.

MR. MACEY: No, sir. What I would like to know is, I think you will agree with me that 933 is probably not a static pressure?

A I will agree that that probably would build up somewhat if you continued it. In other words, if there was a long period of shut-in - of course, I might also point this out, if you completely eliminated pressure, your ratio instead of being 46 as I remember it was 39.4 or something of the sort. I think there is definitely a pressure diferential between wells in different areas of the field. There is some multiplier as to whether it is 1.8 or 1.1 or 1.3. I wouldn't dare guess. I think the 1.18 is a reasonable factor.

MR. MACEY: Have you made any attempt to calculate the reserves in place on a per acre basis under a tract that had the most favorable conditions which you have outlined, such as your porosity of 28.4 and connate water and pressure of 1114 and so forth?

A No, sir, I have not. I was depending primarily upon, in other words, in my presentation, maximum variations, the thing I was attempting to show was that the possible variations due to conditions we knew existed. I wasn't trying to relate that to any particular reserves. Simply trying to show that reserves could vary in that ratio. That could, of course, be done very easily. As I mentioned yesterday, independent geologists on our best well there came up with something over a hundred million per acre and later in arguments on getting our reserves accepted perspective, while that

figure wasn't filed with the Commission. The basis upon which we arrive at total reserves was discussed. As I remember, that was cut to about 80 million an acre and in some of our poorer acreage, as I remember, figures, they were used on those leases, they were as low as six million an acre. Let's call it eight million, it is ten to one there. That wasn't the poorest well, I might mention, that had the estimate of six million to seven million.

MR. MACEY: Mr. Reeves, are you in a position to hazard an opinion or a guess as to how much gas, or how much money, let's put it that way, an operator should received from his income from a well in order to make it economically feasible to drill a well in the basin?

A We have done quite a lot of studying on that. Our conclusions are necessarily general. In other words, on the basis that a Mesaverde well will cost you $85,000 and that you own the entire working interest, we reached this conclusion that you would have to have an I. P. of approximately two million cubic feet per day in order to get your money back. That is simply changing dollars and getting your money back over a period of time. We think that any well, I don't mean that if you drill a well of less than two million that you shut it in. You have made your investment and the only way to get your money out is to produce what you can. Any well less than two million is not considered desireable, and we don't buy acreage unless it is our estimate that we can get a well with an I. P. in excess of two million.

Yesterday we happened to close some acreage and we closed it on the basis that we could get plus or minus four million I.P., and we considered that economic and desireable.

MR. MACEY: In other words, as I understand, it is your opinion

that if you do not have an I.P. of two million feet per day, that you will not get your money back?

A That is correct, yes, sir. Mesaverde well, of course. I assume that this discussion is all Mesaverde. That is right.

MR. MACEY: Do you know how many wells there are in the Blanco Mesaverde that have an I.P. in excess of two million in proportion to the total pool?

A We made some checks on that. I don't recall the figures now. The only figure that runs in my mind was that wells completed in one formation only were about twenty percent of the total of 704. In other words, twenty percent of the wells in the field are less than, completed in one formation, and I would guess that that might be pretty close, but I haven't made any actual study to determine how many wells are uneconomical. Actually the principal concern that we have had is to be sure that the acreage we buy has reserves under them capable of producing in excess of two million I.P. Sometimes we don't guess correctly.

MR. MACEY: That is all I have.

MR. SPURRIER: Anyone else have a question of Mr. Reeves? If not, the witness may be excused. (Witness Excused.)

MR. SPURRIER: Mr. Keleher, do you have anyone else?

MR. KELEHER: We rest our case.

MR. SPURRIER: I believe that Phillips is next on the list to present testimony. Are you ready, Mr. Foster?

MR. KELEHER: May the record show that the Exhibits which the witnesses have testified to, One-A, One-B, and B-Two and Three, and that the bottles of oil be considered as admitted into evidence?

MR. SPURRIER: Without objection they will be admitted.

W. B. BARRY

having first been duly sworn, testified as follows:

DIRECT EXAMINATION

By JUDGE FOSTER:

Q Will you state your name to the Commission, please?

A My name is W. B. Barry.

Q Where do you reside, Mr. Barry?

A I live in Bartelsville, Oklahoma.

Q You are employed by the Phillips Petroleum Corporation?

A Yes, sir.

Q In what capacity? A As a research engineer.

Q Will you state your educational qualifications and professional experience and background?

A I was graduated from the University of Oklahoma in 1936, Bachelor of Science degree in petroleum engineering. I was employed immediately thereafter by Phillips and have been so employed for eighteen years with the exception of four years in the Army during World War II. First employed by Phillips as a junior engineer in the evaluation section, Comptroller's Department, wherein we calculated reserves and rates of production for tax purposes. After a year in that position I was transfered to the Production Department and spent the next two years in the field drilling, developing, testing oil and gas wells. Transferred then to the Economics Department where I am now in the Research Section with the title of Senior Research Engineer.

That has been since 1939, during that time I have been in charge, directly responsible for the gas, gasoline, oil reserves in the area of the Texas Panhandle of Hugoton, and since January of '53 the San

Juan Basin.

Q During your period of experience, has it fallen to your lot to be required from time to time to compute and determine reserves of oil and gas in the various areas that you have mentioned?

A Yes, sir, that is my responsibility and my duty, and I have to do it once a year on all properties, and various other times on specific property.

Q You have previously testified with respect to the San Juan Basin reserves before the Federal Power Commission, have you?

A Yes, sir.

Q When was that?

A That was sometime this spring. I have forgotten the date. It was just as a rebuttal witness.

Q As a rebuttal witness. Have you made any special study of the San Juan Basin and the area and the gas pools that are involved in this hearing? A Yes, sir.

Q For the purpose of testifying before this Commission?

A No, sir, I made a report for the company, but not for the purpose of testifying before this Commission.

Q What has been the extent of your experience in the San Juan field?

A Well, I was assigned that area in January of 1953, and I have spent, I would say, a good ninety-nine percent of my time studying there since. I have made trips to the basin and concentrated all my efforts toward learning all I could about this.

Q You have made a study in which you are now in a position to state your opinion with respect to reserves in the San Juan Basin?

A Yes, sir.

Q Of what did your study consist?

A I gathered all the data that I could on the basin. By that I mean scout data, all the electrical logs, gamma ray logs, temperature logs, core analysis, all the data to give me the basic factors needed to estimate reserves. Phillips, in it's development program, has cored eight wells. Four of them were cored, five of them were cored with mud, three of them cored with gas. Of the eight wells, six of them were cored from the top of the Mesaverde to total depth being somewhere in basal Point Lookout or some instances part of the Mancos shale. The other two wells, one was cored only in the Cliff House, the other cored in the Cliff House and Point Lookout.

With these data I was able to obtain basic factors of porosity, permeability, connate water. These eight wells I felt were a good representation of the formations encountered in the basin; by plotting this data on graphs alongside of various electrical and radioactivity logs I was able to get a correlation between the core data and the electrical and radioactivity logs. That allowed me to interpret those logs on wells which were not cored, to give me an idea of what was pay and what was not pay.

By that means I was able to determine a sand count on all wells in which I had radioactivity logs. That gave me the porosity, the permeability, the water and the thickness. The rest of the data necessary to go into a formula to calculate reserves by volumetric method were determined by measured data. That is shut-in pressures calculated bottom hole, bottom hole temperatures were observed on electrical logs, gas analysis gave me deviation factors to be used. We have, by using the regular volumetric formula, I was able to

determine the reserves.

Q You had core analyses out of other wells too available for your study, did you not?

A I had some core analyses from other wells in the field besides Phillips' wells. I did not use them only as a check, Maybe I should state that my purpose was to make a reserve estimate of the Phillips' properties only. Therefore I used the Phillips' wells to determine my factors. Since I was doing it I kept on going across the field on my thickness, and in so doing I checked the core analysis of other company's wells in the western portion of the basin, I found their porosity did not vary.much.

MR. SPURRIER: Western portion, or the eastern portion?

A Western portion. My core analyses were in the eastern portion on the Phillips' property. I checked the core analysis on other company's wells in the western portion and found their porosities were not much different than what we had found. Their permeabilities were no different. Their connate water was in agreement than what we had found on our own wells. Therefore, I felt that the composition of the pay in the basin was not much different.

Q How were these other core analyses made available to you?

A There was a tradeout agreement.

Q Just trading information? A Trading information.

Q You don't feel you are violating any confidences in stating that you did examine other cores? A I don't believe I am.

Q Good. Now, will you state what you found from these core analysis with respect to your permeability, porosity of the water, and the pay and so forth?

A I found the factors based upon Phillips' cores only that the

intervals that I felt would be pay, the average porosity was ten percent. The average water was thirty percent. The average permeability was .54 millidarces. In determining these factors, I gave a consideration to the lower limit to which I felt I should go in counting pay. That is within the sandstones of the Mesaverde formation. There is a variance in permeability. Not much, but some.

Q In what range?

A Ranges from practically zero to fifteen millidarces. When I stop at fifteen, that is not the highest values that were recorded for us by the core laboratories which we sent the cores to, the core laboratory companies. We had higher values, but there was some thought that they were fractured either naturally or mechanically in cutting the permanent block. Since it takes permeability to move gas in the reservoir, that is the factor I felt should determine my lower limit, which I cared to go to count reserves, to count pay. I selected, after some calculations, comparisons with other fields, and data and literature that I felt it was safe to go down to one tenth of a millidarcy, dry permeability. Gas in that permeability and above will theoretically, and it has been shown to do so, actually move to the well bore under the pressure conditions we expect to find through the years in the San Juan Basin, Blanco-Mesaverde Pool.

That was the lower limit throughout all samples with less than one-tenth of a millidarcy, and calculating my average factors I just gave you. It so happened in studying the core analyses, that I found no zones that average sample had a high porosity and good permeability, it is sort of heterogeneous.

Q What does that word mean?

A It is all mixed up.

A You have zones reflected on gamma ray electrical logs as being sands as we so interpret them, but in those zones we always run across one or two or three samples that has a low permeability. So statistically, I found that in the intervals I picked as pay in this correlation, the core analysis across to the logs that twenty-five percent of those intervals had permeability of less than one-tenth of a millidarcy. So I had to go through a step of, on the wells that were not cored, of counting my pay and then saying from my statistics that only seventy-five percent of that was net.

Q You are talking about how you first determined what you called gross pay and then how you finally determined net pay, is that what you are talking about? A Yes, sir.

Q What pay thickness did you start with?

A In my correlation, core analysis to gamma ray or electrical log, I found that my sand intervals showed a certain characteristic, or character, or you might call swiggle on the electric log.

Q What is a swiggle? A That is where --

Q (Interrupting) You got a log where you can show us a swiggle on?

A It is where the gamma ray log goes to the left with respect to the log as it is printed, otherwise you have characters in the log that has certain --

Q (Interrupting) -- swiggles --

A (Continuing) -- swiggles.

Q Now that I understand it, I don't think it is important for anybody else.

A I found that these sand intervals where we had the core analysis would correlate to those bumps on the electric log, and that

if I picked a shale line on those logs where my core analysis and core descriptions showed shale, that there was a correlation between the best pay, the poorest pay, or the shales in the formation.

Q Right now I want to get something in this record. You say best pay and poorest pay, what do you mean by that?

A Well, there is a relative --

Q (Interrupting) It is a relative term, isn't it?

A It is a relative term. You have sands, shaley sands, sandy shales and shale and coals and lignites in this Mesaverde.

Q It means some has more gas in it than others?

A That is right.

Q When you get through talking about it?

A Yes.

Q That is what you get down to? You find there are variations?

A Yes.

Q Go ahead.

A After obtaining this correlation, I found that there was a line that I could draw between approximately fifty percent of the distance between the shale line and the maximum sand line on a gamma ray log that the interval to the left of that fifty percent line would contain sands, which had a permeability and porosity and water that I considered to be pay.

Q That is net pay? A That was gross --

Q (Interrupting) That is gross pay?

A I beg your pardon, I didn't mean to say that was pay. That was sand counted. In that interval so counted my statistics showed me that there was twenty-five percent of it that had too low permeability for me to consider it pay. Therefore, the sand count thickness

had to be multiplied by a factor of 75 foot to get net pay.

Q To get net pay. What you did then was to take what you found here as the gross pay and multiply it by 75?

A Yes, sir.

Q To get your net pay, is that right?

A That is right.

Q Tell me whether or not you observed any evidences of fractures in examination of these core analyses?

A We obtained some 4200 feet of core in these eight wells.

Q 4200 feet?

A 4200 feet plus or minus a few feet. That was actually cut in the formation, brought up to the surface and laid down on the derrick floor and under my direction and supervision, geologists in my department examined those cores minutely and recorded what they saw. Lithology, fractures, bleeding of gas, odors, any physical thing similar to the examination of samples, only this was done on cores. These 4200 feet of cores show some five hundred feet of interval that show fractures.

Q How is that made evident in the core?

A The fractures that you see in a core with reference to the surface are only the floor ones that are left, the large fractures are broken up, since they are open, or if they are open, when they come to the surface in your core barrel it means you just have two pieces of core instead of one. You don't know whether it was mechanically fractured in coring and coming up, or whether it was a fracture in the formation.

Those were not the fractures I was talking about. The fractures I was talking about were small hairline, considerable number were

vertical, considerable number horizontal. Those are visible with a naked eye. Under a microscope we could find more. They were incipient in nature, by that I mean they began and ended within the three to four inch diameter core. Others began in the core and continued out into the formation, after we got them to the surface. But the core was still together.

Therefore, at the very least, we had fifteen percent of the formation had small fractures in them.

Q So you would say that this area that we are talking about does contain fractures. Is that right?

A Yes, sir.

Q With some of these core analyses made where you were using gas as a circulating medium?

A The three wells were cored with gas used as a circulating medium.

Q You recall the statement made here yesterday you couldn't core a well where you were using gas as a circulating medium?

A Yes.

Q I take it you don't agree with that.

A I think "puddin' and pie" we did it.

Q Anyway, it can be done? A Yes, sir.

Q Do you think that is clear, was it clear to you that the fractures which you observed there would extend across the entire field?

A We found them in every well that we cored. That would give me an indication that it was true throughout the field.

Q Give you something to base a statement on that it does exist throughout the field? A Yes.

Q You haven't found it otherwise?

A We found it everywhere we looked for it.

Q Let me ask you this question about this San Juan Basin. Is there anything unusual about the characteristics of this basin that you don't find in a gas field generally?

A Yes, sir.

Q What is it?

A Well, it is upside down.

Q What do you mean by that?

A It is a saucer instead of, I mean the structure of the basin is contrary to what we normally find in gas reservoirs to be. It is low porosity comparable to sandstone gas reservoirs as a rule. It is more similar to the dolmitic reservoir. It has a very low permeability compared to other reservoirs as exhibited by the core analyses we took, and by the deliverability or potential of the wells.

Q When you say it has a low permeability, do you mean that gas is less likely to move rapidly through the formation?

A In the absence of fractures, yes, sir.

Q In the absence of fractures. But you do find in this area, do you not, that there are areas where the gas does move rather rapidly?

A Yes, sir.

Q Is that another indication to you that there is a fracture condition in this area?

A Well, knowing from my core analysis there is fractures in the formation and never having seen a core analysis that showed any more than the average porosity or water of all the rest of the core analysis, the only conclusion that I can come to is that it was fractured.

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Q Now, you say that the porosity is low compared to other reservoirs?

A Well, sandstone reservoir with an average porosity of ten percent is rather low as compared to other reservoirs that we have delivered gas from.

Q What is the effect in a gas reservoir of low porosity?

A Low porosity would give you a low reserve per unit volume. That is per acre foot as compared to the higher porosity, since it is direct relationship.

Q You mean there is not just the space for gas to be in?

A That is right.

Q That you would expect to find in other reservoirs of this type, is that correct? A That is right.

MR. SPURRIER: Let's take a ten minute recess.

(Recess.)

MR. SPURRIER: Proceed, Mr. Foster.

Q Now, I don't know just where we quit there, Mr. Barry. Have you stated for the record all of the investigations that you made, all of the examinations, logs and core analysis, had you completed that statement when the recess came?

A I feel that I have in a brief way.

Q Is there anything that you would like to add to it before I go to another phase of your examination?

A No, sir.

Q Have you prepared a map on which you have attempted to reflect in graph form, the results of your studies and examination of the San Juan Basin with respect to reserves?

A Yes, sir, I have prepared an Isopachus map showing the gross

sand count that I found in examining and correlating the logs that I had as of August 1st, of 1953, in which I had determined the sand count.

Q Just so that everyone will understand it, you use the term isopachus map. What do you mean by that term?

A Lines of the map showing lines of equal thicknesses.

Q In other words, you have placed on a map of the San Juan Basin, lines that you have drawn that show the occurrence of equal thicknesses of pay throughout the basin?

A Yes, sir.

Q Is that correct? A Yes, sir.

Q We have designated that map as Exhibit No. 1, for the purposes of the record. I am going to ask you to go to your map and detail to the Commission the situation as reflected by your map in connection with reserves in the San Juan Basin. Will you just mark that Phillip's Exhibit No. 1?

A (Witness complies.) This is a map of the San Juan Basin area as of August 1st, 1953, showing my estimate of the limits of proved production and placed upon the map, which incidently shows all the wells that were completed at that time, placed upon that map the gross sand count that I found on each well that I had a log to determine it. Some wells, some of the older wells that were not complete logs run on them. That is from the top of the Cliff House to the Point Lookout and I was not able to obtain a sand count from those wells. Other logs have not been released to the log services, so I did not have them available. Those figures were placed on the map and then contour lines of equal thicknesses were put on the map based upon those figures. That is the gross sand count of which

statistically I found 75 percent of that thickness to be net pay for reserves.

Q What is the variation in your net pay?

A It varies from --

Q (Interrupting) Indicate what point you are speaking of there now.

A We are speaking of the well in 32, Seven, Section 27, which I found to have 92 feet of sand count as a minimum. Highest figure I find right now is in Section 32, 30 North, 8 West, 328 feet, ratio of slightly over three to one.

Q That condition prevails generally throughout the entire area, does it not?

A Yes, sir, there are sink holes of low pressure.

Q You mean low thickness?

A Low thickness, I beg your pardon, in the field at various points. It does thin toward the edges, but there is still no place that is over three to one difference in thickness.

Q The fact that there is no area that you find that is more than say three to one in thickness, what does that indicate to you with respect to reserves in the field?

A Since that is the only variable that I used in my calculation, why I would say that the reserves of the field are not over, slightly over three to one in the proven area to date.

Q That is as, say between tracts? A Yes.

Q In other words, is this a correct statement of what you are saying, that the so-called better wells don't have more than three times as much gas under them as the so-called poorer wells?

A Yes, sir.

Q That is the best well in the field wouldn't have any more gas in place in reserve than three times the amount under the poorest tract of land? A That is right.

Q That is what you are saying? A Yes, sir.

Q In other words, the order of ratio is in the order of say, three to one? A Yes, sir.

Q That is considerably at variance with the order given here yesterday of some forty-six to one, isn't it?

A Yes, sir quite different.

Q Quite different. As a man experienced in calculating reserves in the San Juan Basin, would you say that based on the studies that you have made and determinations that you have made from those studies, that ratio as between reserves under the different tracts in the field are not very greater than the order of three to one?

A Yes, sir.

Q There has been a good deal of talk here about the big wells. As I understand, the way that term is being used it indicates that they have a very high deliverability. Is that the way you understand it when they speak of the big wells? A Yes, sir.

Q Of course, now, that means as big as compared to something else that is smaller? A Yes, sir.

Q When they speak of the little wells, they are talking about those wells that don't have as great a deliverability as some other wells? A Yes, sir.

Q Is that the way you understand it?

A That is the way I interpret the testimony.

Q What, in your studies, did you make any determination or can you tell us why you would have these so-called big deliverability

wells. What causes it?

A I believe that it is fractures, man made or God, made by God.

Q Anyway, God started it? A Yes, sir.

Q Those fractures, I want this record to be pretty clear what we are talking about, are they just open spaces, or broken spaces in the pay formations? A Yes.

Q They are just cracks or open spaces in formation, that is what you are talking about fractures?

A Fractures, I mean a crack that extends some distance, variable distance, variable size, open spaces.

Q As a result of these fractures these wells are able to get what gas they have down there out faster than the so-called smaller wells, wells where the fractures aren't as great, or where the formation is a little tighter, is that correct?

A Yes, sir.

Q Does that indicate to you the fact that you have high deliverability, that there is a great deal more of gas in place, or reserves under a tract of land compared with one that doesn't have such a high deliverability?

A I don't believe that there is any more gas reserves in place appreciably under a well that has a high deliverability as compared to a well that has a low deliverability, with the exception of course in the crack you have a hundred percent porosity for that crack.

Q I see. It is true, isn't it, that the deliverability of the well not only in this area, but in any other area, may be increased by shooting or acidizing? A Yes, sir.

Q What does shooting do to a well?

A Shooting does two things to a well. One, it increases the

size of the well bore, and secondly, it fractures the formation.

Q Yes. Do you have another method of doing that called sand-fracing?

A Yes.

Q What is that?

A It is merely pumping down a light oil with sand in the oil and forcing it into the formation, forcing it to rupture the formation like the name implies, fracturing the formation and increasing the permeability, the sand stays in there and the oil comes back out. The sand pops open the cracks which you form.

Q Then you have the method of acidizing wells, is that true?

A Yes, sir.

Q What two methods of increasing the production from a well is employed generally in San Juan Basin?

A Shooting, and more recently, the sand-frac.

Q The wells in that area are most of them shot or sand fractured?

A To my knowledge with the possible exception of one well, they have all been shot or fractured.

Q All been shot or fractured, so that at the present time when we speak of deliverability on these wells, we don't have any way of knowing what their deliverability was at the time that they were first brought in or produced?

A Before the shot or frac?

Q Before the shot or frac.

A Some operators make a practice of taking a gauge on the well at total depth. It is not entirely general, at least it is not reported in all the services, scouting services.

Q These mechanical means are just employed to increase permeability, are they not?

A Yes, sir.

Q That is the purpose of them, is it not?

A Yes, sir.

Q Increasing permeability by any mechanical means does not increase reserves of oil or gas in place, does it?

A No.

Q Whatever God put there is just there?

A Yes, sir.

Q Whatever man does to it doesn't increase it?

A No.

Q Nor does it decrease it? A No.

Q Speaking about this sand-frac and shooting of wells, can you go to your map there and point out some examples of shots that have increased the deliverability of a well?

A By shooting?

Q Yes, or sand-frac, either one. Increasing the productivity of those wells by sand-fracing.

A There has been one well that I could get the records I have available which Phillips holds the twenty-five percent interest, and which has been sand-fraced, the El Paso 3-J Howell, in Section 11, 30 and 8.

Q Put a circle around that.

A (Witness complies.) My Exhibit does not show that well because it has been drilled since recent completion.

Q Yes, sir.

A Wherein there was a natural gauge taken in the Cliff House and the Point Lookout for a total of 163 M.C.F. The well was sand-fraced in both those formations at a three hour official test of three million seven hundred fifty-eight M.C.F. Shut-in pressure of

1085 pounds. Sand-frac increased the potential, or the productive ability of this well from 163 M.C.F. to three million seven hundred fifty-eight M.C.F.

Q That is a ratio of what? A Better than twenty to one.

Q Increased it better than twenty to one. Do you know of any other examples where that would occur or has occurred?

A Well, there are many examples of increases from shots. I have some --

Q (Interrupting) Could you give us just a few more?

A Phillips Petroleum Company 30-6 M Mesa-5-35 tested natural at total depth one million four hundred sixty M.C.F. per day. Official potential of four million one hundred ninety M.C.F. a day at the end of six hours. It was shot through the entire Mesaverde formation with 2,091 quarts.

Q What was the increase in the ratio on that well? What happened? What is the ratio there?

A The ratio there was about four to one.

Q About four to one? A Yes, sir.

Q In shooting throughout the field, do you maintain that ratio of approximately say twenty to one?

A It varies considerably. I just picked two at random here.

Q Give me just one more. Just put the bad ones in with the good ones.

A It is not that I am ignoring the bad ones. I just don't have much data here. As I said before, the operators don't always test the wells at the T.D., naturally --

Q What does your --

A (Interrupting) I am afraid I don't have it.

Q What does your data show the variation to be after shooting in the potential or the deliverability or productivity of the well? What will it range, from what to what?

A Well, the maximum would be 100 percent improvement, because there is some wells out here that produce no gas natural, that after shooting do produce gas.

Q You say there are some wells where when you drill them in they don't produce any gas?

A No measurable of gas.

Q Then you shut them? A Yes..

Q Then they will make producers?

A They will make producers. The minimum I have no figure on. I have not studied it.

MR. FOSTER: I believe that is all.

MR. SPURRIER: Mr. Barry, you don't mean 100 percent do you?

A Yes, infinity.

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

MR. REEVES: I have a question.

CROSS EXAMINATION

By MR. REEVES:

Q I believe you testified that the maximum difference in reserves was three to one? A That is right.

Q Also believe that you testified that in your interpretation at sands, it varied from 92 to 320 feet of thickness?

A That is the maximum and minimum I could find.

Q That was a ratio of 3.56 to 1, is it not?

A I accept your arithmetic. I said roughly three to one, I intended to.

Q Those sand thicknesses were determined, were they not, primarily on core analysis in the eastern part of the field?

A My correlation to obtain pay count was mainly in the eastern portion of the field.

Q So that different engineers would probably arrive at different interpretations of the logs as to sand thickness, would they not?

A It is normal.

Q It is a matter of judgment?

A It is a matter of judgment.

Q From one. Did you, in taking into account the reserves underlying the well, take any other factors into consideration than sand thickness? Let me phrase the question another way, Mr. Barry. If porosity varied, wouldn't that also affect the reserves underlying the well site?

A If porosities varied, it would vary the reserves.

Q Your judgment is they don't vary, so you ignore that factor?

A I didn't ignore it. I took every data that I had and found it did not vary.

Q It is a difference of opinion as to whether it varies or not?

A I have no data to show it does vary.

Q What about the affect of variation in connate water, wouldn't that also change the recoverable reserves, given sand thickness, given porosity? A Yes, sir.

Q Wouldn't the difference of pressure also vary?

A Yes, sir.

Q In other words, so that if we arrive at a difference in possible porosities, difference in connate water, and difference in pressure, the possible pressure would be multiples of that factor?

A If I did or if we did?

Q If we did, or you did, or any engineer.

A Anybody that comes out with a different factor will come out with a different answer.

Q If there was a difference in porosity, if there is a difference in connate water, if there is a difference in pressure, the ratios and reserves under the well would be considerably more than three and a half to one?

MR. FOSTER: Depends on what order of the ratio.

A That is right, if you come out lower.

Q The point that I am trying to make is that an engineer examing the same data would, interpreting it different, would come up with a higher ratio from three and a half to one?

A No, sir, because I haven't any data that I didn't examine. If you have some data that has the things that you are talking about and, of course I haven't got them available, and you have and you use them, therefore you would come out with a different answer.

Q The point I am making, if I have the data, I could come out with a reasonably higher ratio under --

A Yes, sir, you could come out with higher or lower.

MR. FOSTER: Do you have that data?

MR. REEVES: Yes, sir, I testified about it yesterday.

MR. FOSTER: You didn't give it.

Q There is another question I would like to bring out. On your exhibit and interpretation taking sand thickness only into account, that the well that you pointed out happened to be in the area of highest sand thickness on your map. So deliverability on that is to some extent proportional on your map to variations in sand thickness?

A Could I have that question read back, or would you mind rephrasing it?

Q I will try to, Mr. Barry. The point I am making is, are you aware that the high deliverability well is also in the area of maximum sand thickness on your map?

A I am aware that the larger wells, the larger deliverability wells lie generally in the center here, that is where the majority of my three hundred, two hundred fifty plus feet of sand pay is.

Q In other words, there is some indication that the greater sand thickness increases deliverability of wells?

A Yes, permeability feet is the only thing you are talking about on what the well produces, and if you have got a thicker feet, same permeability, you would have a higher.

Q In other words, there is some relationship between deliverability and reserves there? We differ as to --

A (Interrupting) Yes, we differ as to degree.

Q That is right. One other question I would like to ask you, Mr. Barry. You testified that you threw out certain fractures and cores because they were actually core barrel fractures, mechanical fractures made in taking the core. Could you definitely state that a hairline fracture couldn't be made by core barrel action?

A No, I couldn't definitely state. I would say that it is unlikely.

Q In other words, we get to a matter of opinion of engineers?

A That is right.

Q Then one other question, I believe yesterday that my testimony I stated that we had not cored those wells because we drilled them with gas, isn't coring with gas relatively in the experimental

stage and relatively a new development in the field?

A It is not, coring with gas is, well this field is all so new I don't know what it is relative to it. Most of the development has taken place over the last, the majority of development has taken place over the last two years, the most wells have been drilled. We cored wells with gas early in '53 which is a year ago.

Q Experimentally. In other words, that was about the first time it had ever been done? A That I couldn't say.

Q In other words, it was development of experimental and development. And it is not the practice --

MR. FOSTER: (Interrupting) That is another Phillips first.

A Mr. Reeves.--

Q Give Phillips a first on that, Mr. Barry.

A I do not know, I know it is not the practice to core the wells. I don't know whether that is a cost or --

Q Probably it is economic.

A What is the ~~cost~~ of not more of them being cored. Maybe people don't want the data.

MR. REEVES: I think that is all.

MR. SPURRIER: Mr. Smith.

By MR. SMITH:

Q Mr. Barry, in making your calculations of your net sand thickness, was that the phrase you used, net sand thickness of 75 percent? A Yes, sir.

Q I believe you testified that you eliminated from your calculations any sands having less than one-tenth of a millidarcy, is that right? A Yes, sir.

Q That measurement is the measurement applied to permeability,

isn't it? A That is right.

Q And permeability is directly tied in with deliverability, isn't that right? A Yes, sir.

Q It is a major factor in considering your deliverability?

A Yes, sir.

Q The ability of the fluid to go through sand. Your elimination then of one factor has become the one controling factor in deciding whether or not it was pay or not pay was permeability?

A That was where I cut off point. It was down to that point that I felt that gas would contribute to the well.

Q In other words, if you have no permeability, you have no gas?

A That is right. Well, you have gas there, but you won't recover it.

Q In going into a matter from the standpoint of proration, aren't we concerned primarily with recoverable gas as distinguished from gas which cannot be recovered?

A I am a reserve man. I am not a proration man. Mr. Culender might be able to answer that.

MR. FOSTER: I have a man that can.

Q You know you can't answer it?

A I have called those proved reserves.

Q I beg your pardon.

A I have called them proved reserves, otherwise my experience and calculations that I made, I said the gas was going to get out of the ground.

Q You said, "I didn't quit".

A I intended for that gas not to stay in the ground, the amount that I have shown to be recovered here.

Q In making your determination, one of your basic assumptions was one factor alone, that is the lack of permeability, you would eliminate a certain percentage of the sand?

A That is true. Because permeability causes the gas to move, allows the gas to move. The lower the permeability, the higher the water, the less gas in there.

Q That is right. So having used that one factor as a basis for elimination of your sand thickness, isn't it logical to assume that permeability can also be a single factor contributing to the productive and the actual gas which you may recover?

A Will you put time in there?

Q I beg your pardon. A Will you put time in there?

Q I don't think time is a factor right now, since we are talking about reserves.

A You are talking about recoverable reserves.

Q That is right. A Time enters into that.

Q That is right, permeability affects your time as well as your ability to produce, but failure to have permeability eliminates it completely.

A Permeability eliminates what?

Q That is what you did when you made your calculation one-tenth millidarcy you eliminated that from the consideration?

A That is right.

Q You could take permeability on the other side and use that as a control factor to determine whether or not you had recoverable gas?

A I didn't do it. I said that is recoverable.

Q I asked you could it be done.

A Could you take your, what you are asking me, could you take the highest measured permeability, say at 200 millidarcy and say that is the only thing you are going to get gas out of?

Q No, I am saying that permeability could be used as a measure of the recoverable reserves as being a more allowable factor than perhaps some of the other factors taken into consideration in the absence of knowledge of the exact extent of the other factors.

A Yes, sir, it could be used. I wouldn't like the answer.

Q Mr. Barry, in making your calculations, I believe you testified that the net pay was, it was, was of a hetergenous nature?

A Hetergenous nature.

Q That means, asyou said, I believe,it is all mixed up.

A Not the net pay.

Q The net pay is not mixed up?

A Not the net pay. You mean -- it is all mixed up.

Q Now it all being mixed up and there will be variances so far as porosity is concerned within your net pay and the taking of any arithmetical average, doesn't do justice to the true physical condition, does it?

A Yes, sir. I say it does.

Q That being the case --

A (Interrupting) I say it does do justice.

Q It does do justice? A Yes.

Q Let's say in a particular 320 acre unit you had an average porosity of 20 percent. If you take the entire field you have an average porosity of ten percent. That is what you have done, as I understand it, taken ten percent?

A No, sir, I haven't got the ranges like that.

Q You haven't what?

A I haven't found any area that has twenty percent porosity.

Q What is the figure you took?

A I took a ten percent which is an average.

Q Average of what? A Eight wells.

Q What was the lowest porosity in one of the wells contributing to your average? A 8.84.

Q 8.84. What is the highest? A 13.05.

Q Do you know of any wells in the field other than the eight that you used for your calculations?

A Yes, I have examined core analysis on other wells in the field.

Q What is the highest porosity that you have found on any of the cores that you have examined?

A I don't have that figure. I have got the average is all.

Q I know, but --

A (Interrupting) Average per well.

Q To go back to the question I asked you about the fairness of the arithmetical average, I think we should know whether there is a possibility that the porosity could be as high as twenty percent?

A May I correct you on one thing, on the arithmetic average?

Q I understand you to say arithmetic average.

A It was a weighted average, the number of samples from each well because of the hetergenity of the formation, if we had a lot of samples on one well, very few samples on another well, the few samples might not represent the total of entire well as much. So we weighed them by the number of samples.

Q Did you weight in each well or did you weight the eight wells?

A I weighed the eight wells. I just got through giving you

the highest and the lowest for each well.

Q That was the average of high. Assuming that you have a sand thickness of 350 feet and your average is eight, whatever it is that doesn't mean that every foot as you go vertically in that 350 foot zone has eight and a fraction percent of porosity, does it?

A No.

Q In other words, you could have, say, fifty feet that would be as much as twelve percent, have fifty feet, be as low as maybe three or four percent in making your weightage, did you find such a discrepancy as that I described?

A No, we don't find any interval that has uniformly a high porosity. Or new interval that has uniform high, a low porosity. It is mixed up.

Q It is just mixed up all through there?

A One sample would have a twelve percent porosity possibly. The next sample a six percent, the next foot we sampled out of the next one at ten.

Q They vary back and forth?

A Varies back and forth.

Q Going back to our law of averages, isn't it quite possible that in some wells you could have a higher average throughout the entire interval?

A It is quite possible, but I have no data that shows that.

Q Now, Mr. Barry, I have been informed that the ordinary measure of the limits of the field is that the porosity and permeability pinches out, isn't that the usual idea as to the productive characteristics of this reservoir?

A I believe that the exhibit was put on the stand the other day

by the Pubco organization, that showed that the sand was present at the outcrop as sand.

Q That is right. So that --

A (Interrupting) So I don't believe there is a pinching out of porosity and permeability.

Q Do you mean that you can draw a gas well over where it out crops? A I don't know.

Q Do you recommend to your company that they try it?

A No, sir, but it doesn't say there is any porosity and permeability there.

Q There is no gas there? A No, sir.

Q How do you account for the fact that the field is limited or steps some distance before the sand outcrops?

A That is a good question.

Q Well, do you have the answer?

A There is lots of reasons I can think of. One, there could be a water seal, that is you get the water, percentage of water high in the sand to your relative permeability to move by the gas or below. Therefore, you would not lose the gas. This is a subnormal pressure reservoir for its depth, some of the gas must have gone somewhere already.

Q Wouldn't also a decline in the porosity account for the fact that the gas isn't present as well as --

A (Interrupting) It could.

Q Since the weaker wells, that is the wells with the poorer deliverability, are at the periphery of the field, isn't it logical to assume that as you go towards the edge of the field you have a decline in your porosity, a higher percentage of connate water and

other factors which result in non-production?

A Sir, you asked me which well had the highest porosity.

Q Beg your pardon.

A You asked me a minute ago which well had the highest porosity. I said 13.05. That is it in a, one well which is outside the field. It is the highest porosity.

Q Is there any production on the east of that?

A No, sir.

Q Isn't it possible that the field may go on for some distance the other side?

A It is possible that the field may go on in some distance in lots of ways in this, in any direction.

Q In other words, there has been no definition of the field over in that point. How about down on the south and west sides?

A I have no evidence whether it will or will not. This is so far away from the area I was studying, I don't have too much data on it.

Q Do I understand then, that the area you studied was confined to the eastern side of the field?

A The area I studied, the area for which my report was made, was somewhere in that nature. I had data over here both on cores and logs. I carried them on across.

MR. SPURRIER: For the record, how much of the basin was that? Your pencil doesn't show up in the record.

A I studied 473,545 acres.

MR. FOSTER: Out of how many? A Just a minute.

MR. SPURRIER: Let's take a short recess.

(Recess.)

MR. SPURRIER: Mr. Barry.

A I believe you asked me, the Commission asked me how many acres in my study, what percent of the total field I studied?

Q That is right.

A The gross acreage which Phillips has an interest under the unitization agreements and which my study covered, was 473,546.79 acres. The total area enclosed in my estimated limits of proved productive area is 779,157. Naturally in studying the units in which Phillips had an interest in, I had to study wells just outside those units to get control, so the first figure is on the low side. I studied wells in a larger area than that.

Q Is all of that acreage within the proven limits of the Blanco Field, or is it located elsewhere?

A It is located within the proven limits.

Q I don't believe --

A (Interrupting) Sir, I made a misstatement of fact a minute ago. Some of that acreage is not in the proven limits, by subtracting about four figures I could give it to you.

Q I think the Commission asked the question. Do you want him to subtract those figures?

MR. SPURRIER: If they are wrong we do, yes.

A The corrected figure of the acreage studied within the limits of proved production is 444,301.

Q Your study, however, is primarily devoted to the eight wells from which you took the cores? In other words, I would like to find out the scope of your figure. You studied 440,000 some odd acres. What was the nature of that study?

A The nature of that study was as you say, the eight wells with

the starting point. Those were the wells in which I had the basic data necessary to get all the factors necessary to get the reserves, the porosity, the permeability, the water and the correlation between, to obtain a correlation of electric logs. Then that data correlation was applied to the rest of the wells.

Q Where were those eight wells located?

A One well was located in Section 8, 31 North, 7 West, one well was located in Section 29, 32 North, 8 West, one well was located in Section 35, 30 North, 6 West, one well was located in Section 22, 30 North, 5 West, one well was located in Section 25, 29 North, 6 West, one well was located in Section 21, 28 North, 3 West, one well was located in Section 21, 29 North, 4 West. I beg your pardon, 29 North, 3 West, one well was located in Section 20 of 27 North, 3 West. Eight wells.

Q Now referring to the well --

A (Interrupting) In Section 32 of 30 North, 5 West.

Q What was the average porosity in that well?

A That well was cored only in the Cliff House formation within the interval cored and recovered and analyzed. I had 23 samples which were greater than one-tenth of a millidarcy and had an average porosity of 11.02.

Q Let's refer to this well located at this point.

A That is in Section 21, 28 North, 3 West, which is the Phillips Indian B-1 of 78 samples, which I counted pay had an average porosity of 10.38.

Q Let's go back into the more or less center of the field here, let's have the porosity on this well.

A That is Phillips 30-6 Mesa 5-35 located in Section 35 of

30 North and 6 West. That well there was 152 samples that had an average porosity of 9.4.

Q Let's take this well up here.

A Phillips Mesa unit 32-7 No. 1-8 located in Section 8 of 31 North, 7 West, had 132 samples whose average porosity was 9.99.

Q Would you draw an assumption from that brief testimony that as you went to the west the porosity declined?

A My range on the three that I gave you was 9.point --

Q There were two at 9 point something, and --

A (Interrupting) Since this well only --

MR. FOSTER: (Interrupting) What well?

A Since the well in Section 22 of 30, North, 5 West which had 11.02 percent porosity and the highest of the four I just remembered was only for 32 samples, and only out of the Cliff House, and whereas the other wells were for samples from all three formations, I don't think that it is representative in answer to your question based on this alone.

Q How about this well here?

A This well has a higher porosity than the other two.

Q In answer to my --

A (Interrupting) Which is less than one percent of porosity. I do not think that is indicative that it is getting poorer as you go West, no, sir.

Q You don't consider then, that your sampling technique was of sufficient accuracy to establish that it was going poorer as you went west?

A I feel that the wells in which the ranges of porosity that I have, the wells that I used gave me a representative porosity,

the range, the maximum and minimum are not too much, it does not tell me anything of a trend of porosities east or west or north or south.

Q Well, if it won't tell you that, would it also not tell you that the average porosity in all these wells are the same?

A Yes, sir. It won't tell me that the average porosity in all the wells are identically ten percent.

Q And you can't --

A (Interrupting) They will have the range of eight percent to ten percent, and in that variance.

Q I got the impression from your testimony that you didn't consider your sampling of sufficient accuracy to establish a trend, am I right?

A I don't believe this is a trend, no, sir.

Q Do you consider that your sampling is of sufficient accuracy to establish a trend?

A If there is no trend I can't establish one.

Q The reason for it is that you don't have sufficient sampling, is that correct?

A There is no trend.

Q No, you misunderstand my question. I am asking about your computation, not about your conclusion.

A I can't establish a trend that I don't know exists.

Q You have taken certain samples there and used them as a basis for making calculations. A surface impression from your sampling there would leave the impression that you had, it had a decline in the porosity as you went west. You say that your sampling was not sufficiently accurate to establish a trend and I am asking the question now, that being the case, is your sampling sufficiently accurate to establish anything?

A It is sufficiently accurage in my judgment. I have 757 samples.

Q From eight wells? A From eight wells.

Q How many wells in the field?

A Approximately 600, 700.

Q 704 I believe was testified to yesterday.

A I will accept your figure.

Q Would you consider that samples from eight wells in the northeast portion of the field and down in the east border, to be representative and to afford sufficient information to establish the porosity for the wells in the rest of the field?

A I believe I testified on direct examination that I had available core analysis in this area.

MR. FOSTER: What area is that?

A That is the central portion of the field.

Q I don't believe you testified as to the highest porosity you found in those core samples? A No, sir, I didn't.

Q Do you know what that is?

A I know some averages is all that I have with me. I have the complete data in my office in Bartlesville. I have core analysis on a well in Section 19 of 30 North and 9 West, whose average porosity of all the coresanalyzed in the Cliff House and Point Lookout formation of 9.4 percent, identical to the 124 miles east that we just talked about.

Q Do you have any others?

A I have an analysis on a well in Section 29, 31 North, 9 West whose average porosity of all the samples analyzed was 6.3. I do not recall whether that well was analyzed by the same laboratory that

analyzed the rest of them. I do know that the 9.4 was done, was obtained by the same laboratory that obtained the majority of the core analyses.

Q Do you know how many samples were taken in each of the two wells and from what area?

A In the well in 19, 30 and 9, there were 222 samples. In the well in 29, 31, 9 there were 138 samples, both wells were cored only in the Cliff House and the Point Lookout formation. Not in the Menefee.

Q Not in the Menefee? A No, sir.

Q Coming back to the question I asked you awhile ago, what is the highest average porosity that you found in any of the wells in which samples were taken?

A That was 13.05 on the Phillips Indian 1-A for 76 samples, that well being located in Section 21, 29 North, 3 West.

Q Does that include all of the samples which you analyzed, that was one of the, I believe, Is that the highest core analysis percentage that you found in any of the cores you examined in the entire field?

A Yes, I believe it is.

Q What is the lowest that you found on the average?

A That was, I believe I just read, 6.3 on the well in 29, 31, 9, that being the lowest.

Q That would establish an order of magnitude of a two to one diferential then in the average porosity?

A Yes, sir.

Q A little in excess --

A (Interrupting) Those two figures, so multiply up.

Q Wouldn't you consider it to be reasonable in establishing the reserves, since porosity does have a direct connection with the reserves, to consider the possibility of a two to one differential in addition to the three and a half to one which you testified concerning your net pay?

A Knowing what I do about the 6.3 which is the lowest one, I don't know that that would apply, in that I don't know that it was done under the same method that the rest of them were. It wasn't my core analysis, my company's core analysis. If that is true, if that is the porosity average of that well, there appears to be 6.3 average there, a 13.5 there. That figure though, of 6.3 was every sample analyzed in that well. It is not within a pay count, so if you are thinking that the things that you would not count, call pay as being lower porosities, which is taken out of this figure, when you got the average and still remain in this figure, because I just took the total, I can't say that there is a two to one there.

Q Well, assuming that those conditions were more or less similar and since we were working in averages anyhow, wouldn't it be a reasonable assumption for the Commission to make here that you could have as much as a two to one differential in the porosity? In your opinion, don't you think that there exists in this field out here areas where your porosity in a particular well is on the order of two to one higher than in other wells?

A In what we want to call as pay?

Q In what we call as pay, that is right.

A I have no data for that.

Q I am asking your opinion based on your knowledge and the study that you made.

A My opinion is based on the data I have and the study that I made.

Q I was under the impression that you made it in a -- based on core and --

A (Interrupting) I haven't got anything to substantiate the question you asked.

Q Wouldn't it be substantiated by the knowledge of the core data?

A There is a two to one?

MR. FOSTER: You want him to base an answer on something he doesn't know about.

MR. SMITH: I think he knows about it, Judge.

A I said the 6.3 was not comparable to the others, I have no data to substantiate that.

Q Taking the other data, you would at least concede that it is on the order of one and a half to one?

A Definitely that, that the porosity well by well shows from the data that I have here, I have there that it varies.

Q And due to the variance in samples that were taken, some of them not being taken in certain locations, some of them just in the Cliff House, that it is quite possible that it could be even higher than that, isn't that correct?

A No, sir.

Q You don't think it is?

A I have nothing to think that it might be higher than that, no, sir.

MR. FOSTER: Are you asking that could he think it was higher?

MR. SMITH: I am asking him a reasonable assumption. If it is not a reasonable assumption.

A I don't think it is a reasonable assumption.

Q Let's discuss connate water. I believe you testified awhile ago that a possible reason for the limit of the field here is the existence of connate water, water saturation?

A Yes, sir. Somewhere in the reservoir. I don't say this is the ultimate limit of proved production in the San Juan Basin. That is not that line around it. The ultimate as presently proved.

Q You have something on here that says estimated limits of proved production.

A As of August 1st, 1953.

Q That is right. Now as of that date, there being shall we say, let all wells around the side which would lead people to believe they had got to the edge of production.

A That was not my assumption. That is my estimated limits of proved production, proved by well. It has been changed in the last year by wells being drilled outside that line.

Q Well, the existence of connate water has a direct relationship to the quantity of reserve? A Yes, sir.

Q If it is occupied by water, it can't be occupied by gas?

A Yes, sir.

Q Have you run any samples or have any knowledge or information with respect to any of the wells cored, or any of the other wells in the field with respect to the existence of connate water?

A Yes, sir, that is how I got my factor of 30 percent.

Q Thirty percent of what?

A Floor space, thirty percent would be filled with connate water.

Q Does that vary from well to well?

A The connate water, average connate water in Phillips 30-6 Mesaverde 5-35, located in 35, 30 North, 6 West, had a connate

water of 30.28 on the samples counted as net pay. The well Phillips Mesa Unit 2-29 located in Section 29, of 32 and 8 had a connate water content average eight samples counted, 24.9.

MR. FOSTER: How far apart are those two wells?

A Twenty to twenty-five miles. The Phillips 29-6 Mesa Unit 3-25 located in Section 35, 29-6 had an average connate water sample in net pay of 29.09.

Q What is the --

A (Interrupting) That is all the connate water data that I have on the Phillips wells. That averages 27.89 for the three wells, the value I used for the field was 30 percent. I was just a little bit conservative.

Q Do you have any information on any wells besides the three wells with respect to the content of connate water, in order to shorten the process a little bit, if you have the information, what is the highest percent and what is the lowest percent.

A I have it on the two wells that I gave you on all the samples run again which is every sample regardless of porosity and permeability, which is high because the lower permeability always has more water in it, the samples are 37.9 on the well in 19, 30 and 9.

MR. FOSTER: Whose well is it?

A El Paso Natural Gas. And all the samples in the well in Section 29, 31, 9, averaged 31.7. That is the well that had the lowest porosity.

Q Are those the same three wells or are they additional wells that you first talked about? How many wells altogether do you have information on with respect to connate water?

A Right here and now I have information on Phillips three wells and two foreign operated wells.

Q You don't have any information as to what the connate water may be in other wells in the field aside from those that you just testified about?

A Not with me. I might have one or two more.

Q Do you have any knowledge or recollection of the discrepancy or disparity between the connate well from the highest well to the lowest well that you know of?

A None other than these comparisons.

Q What is the order of magnitude with respect to displacement represented by your highest and lowest figures?

A The lowest figure there was 24.29, the highest --

MR. FOSTER: (Interrupting) The lowest figures where?

A The lowest connate water percentage on any well was 24.29, comparably highest connate water on any well was 30.2-8.

Q Would you answer my question?

A The difference is six percent.

Q Is that six percent factor --

A (Interrupting) Six percent connate water.

Q Six percent difference in displacement by connate water?

A Yes.

Q Going back to the question, changing the subject a little bit, going into the question of sand-fracing.

A Yes.

Q And acidizing, which I believe you testified resulted in increasing materially the deliverability of certain wells, I take it

as a basic assumption of your testimony that you are assuming that conditions are equal in respective wells. In other words, that that is the sole cause of the increased deliverability?

A That is all you do to the well. You test it naturally, the T. D. tests so much.

MR. FOSTER: What is the T. D., total?

A Total depth. You test it, then, and you have so much gas. You sand-frac it and test it again and you have additional gas.

Q Have you observed the production history of a well which has been so treated over a period of months or years?

A No, sir. It is rather new.

Q You would anticipate that if the sole cause was due to the sand-fracting or acidizing, that there would be a rather marked drop in the pressures? In other words, you would get back down to the original pressure as soon as you had exhausted the gas, so sand-fracted or acidized.

A That is a rather long question. I will attempt to answer it. Unless you want to rephrase it and shorten it up one phrase at a time.

Q Well, briefly stated, perhaps I might be able to state it more briefly. A well that has been acidized or sand-fracted resulting in higher deliverability should not continue on that higher deliverability for a considerable period of time.

A Is that a question?

MR. FOSTER: Are you testifying or is that a statement?

Q I am asking a question, if that is a reasonable assumption.

A No, sir. The decrease in that deliverability will come about through decrease in pressure. The decrease in pressure will come

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about through percentagewise depletion of reserves. It depends upon your reserves how fast that deliverability comes down and not on anything else.

Q So that if you found a well to continue to maintain this high deliverability over a period of a year or two years, you would naturally assume that it had greater reserves?

A Or drainage area.

Q Well, we are assuming that this man-made condition is limited to the extent --

A (Interrupting) I am not, maybe you are.

Q I was making that assumption, you weren't apparently.

A I don't know.

MR. FOSTER: That is a little argumentative it seems to me. I don't object to him asking the question, but now he has had an undisclosed assumption here it appears in the question that he asked.

MR. SMITH: Would the witness like to correct his answer?

MR. FOSTER: No, I would like you to state what your assumption is. He will answer the question if you can ever get it up there. You got something in your hip pocket, why get it out. He will answer the question for you if you will get it up there.

MR. SPURRIER: Let's recess until 1:30.

(Noon Recess.)

AFTERNOON SESSION
June 22, 1954

MR. SPURRIER: Come to order.

W. B. B A R R Y

being previously duly sworn, testified further as follows:

By MR. SMITH: CROSS EXAMINATION (continued.)

Q On the spread in the connate water in the three, four or five wells that you looked into, as I recall it, it was between 24 and around 37 percent?

A I gave you such a spread, but they were not comparable, Mr. Smith, in the fact that one of them considered all samples that were

taken, the other, that was the higher value, the 37 percent, the other consisted only of those portions that I considered pay.

Q What was the spread in the others?

A The spread in the two comparable figures were from 24.29 to 30.28. That was, I think, we went through that, that was a difference of 6 percent connate water.

Q The differential would not be 6 percent by volume, it would be the differential between 24 and 30 percent?

A The difference between 70 percent and 86 percent.

Q Roughly in the order of magnitude between the two by comparison of about a third increase, or would it be on the order of one and a half to one?

A It would be a difference of 6/70ths. It would be 22.8.

MR. GRENIER: I didn't understand, that was the difference between 24.29 and 30.9?

A 30.8 was the other figure.

MR. FOSTER: What is the difference you gave there?

A That would make a difference in your reserve of whether your gas space was 86 percent or the one minus the connate water, 86 percent on the --

MR. GRENIER: 76, would it not be? I couldn't follow your figuring there.

A 6/70ths. It would be in the neighborhood of 8.6 percent.

Q Is that your final answer now? A Yes, sir.

Q Do you know whether or not certain of the wells over in the northwestern, up in the other side of the Animas River, run as high as 60 percent water saturation? A I don't know.

Q If that fact were true, would it make a difference in the

results of your study? A Yes.

Q It would tend to show a large disparity with respect to reserves as constant with the area where you have less connate water?

A If that was the case, yes.

Q Going back to your study, as I understood it, you took the eight wells and from it made certain assumptions, am I correct, and applied that to the 440,000 acres that were under your study?

A From the eight wells I didn't make any assumption. From the eight wells I got the basic data that allowed me to go on.

Q In other words, you arrived at a formula from the eight wells?

A I arrived at a formula. No, the formula is the same in every field. No, I arrived at the basic factors from the core analysis to base a formula.

Q You applied your formulas then, as far as your study, too?

A That is right.

Q Wouldn't you say your study wasn't as much a study of the 440,000 some acres as it was of eight wells?

A No, I would not say.

Q If the assumption of the factors being constant throughout the 440,000 acres, isn't it a necessary incident of your study?

A I used the factors that I obtained from the eight wells as representative of all the wells in the field, yes.

Q What is the permeability in the eight wells that you studied?

A The average was .54, .54 millidarcys.

Q .54 millidarcys. Do you know what the maximum millidarcys may be in any of the wells in the field?

A I believe I testified this morning that I felt that the maximum was varied from practically nothing to fifteen.

Q To fifteen. So that the eight wells you took were not the arithmetical average of the spread and could be considered actually poorer wells?

A I did average that fifteen in, the highest one with the lowest one and got the average of 5544.

Q That is the average of the eight you studied?

A Yes.

Q Noticing that they have up to fifteen millidarcys in the field, it is obvious that there are certain wells in the field which are considerably higher than the average of the eight that you took?

A I don't know that to be the case, no.

Q Isn't permeability the main factor in determining the probability of the gas? A It is a factor, yes.

Q Would you say it is one of the chief factors?

A Well, we got to stick time in there. Are we talking about equal time?

Q No, I am talking about recovering the gas over a period of exhaustion to exhaustion of the reservoir.

A To exhaustion of the reservoir?

Q Yes. A I don't think it is.

Q In other words, it is just a question of time, in your opinion, is all it amounts to?

A It is the product of permeability and time.

MR. SMITH: I believe that is all.

MR. SPURRIER: Anyone else have a question of Mr. Barry?

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

By MR. HOWELL:

Q Mr. Barry, this isopachus map which is Phillip's Exhibit No. 1.

as I understand, was constructed by you from the results of your reserve studies which you have outlined, and does that map show the gross sands or the net pay sands? A It shows the gross sands.

Q It shows the gross sands, so the thicknesses of sands as shown on the Exhibit 1 would be reduced by 25 percent to reach the net pay sand? A Yes, sir.

Q The figure that you took, the arbitrary figure of 75 percent is one which possibly another engineer might have said that maybe 85 percent was the figure. Another might have said 50, is that correct? A No, sir.

MR. FOSTER: I object to the question because it assumes that he said he had taken an arbitrary figure and he didn't say any such thing.

Q How did you take that figure of 75 percent and apply it to every sand in the field?

A I found in the wells that were cored, the intervals that correlated between the core analysis and the gamma ray logs to pay that 75 percent of the samples within that interval contained permeability greater than one-tenth of a millidarcy. Twenty-five percent numerically of those samples means a permeability of less than one-tenth of a millidarcy.

Q So that your 75 percent figure was based purely upon the cores taken from eight wells. That is the basis that you used your 75 percent figure from, is it? A Yes, sir.

Q And someone else in estimating net pay might determine that permeability should be set at a higher figure, in which case the net sands would probably be less, wouldn't they?

A Yes, sir, they could do that.

Q And the estimates which result tend to be liberal, or tend to be conservative according to the method which is used, is that correct?

A You mean you are asking me whether I think mine is liberal or conservative?

Q No, I am just saying that by another set of samples giving a different figure would result in either more liberal or more conservative estimates for the sand thickness in the field, would it not?

A You took another set of samples you would get a different answer, yes.

Q Different studies would have some variations depending upon the basis that was used in selecting the net pay from the gross pay?

A Yes, sir. Do it a different way you get a different answer.

Q However, if the same method is used consistently, why there is a degree of relationship that is consistent within that particular method. Maybe I don't make myself clear here, but suppose someone else used a method whereby they came out with a different net footage, nevertheless that method would indicate somewhat the same relationship between thick sands in one locality and thin sands in another as is indicated by your method, wouldn't it?

A It would depend on how they did it. I don't know how they are going to do it.

Q Suppose somebody used 50 percent instead of 75?

A They would cut the plat 50 percent over the entire area, you would have 50 percent on the east and 50 percent on the west if they did do it that way.

Q You have a bottom cut of point of net thickness of 92 feet, I believe?

A That was, I believe, I read a figure of 98 being the lowest gross sand thickness of any well that I had counted the pay on.

Q There are wells that are completed in the basin that are completed in a net pay thickness of less than that, aren't there?

A To my knowledge, no.

Q You don't know of any?

A I have none so indicated.

Q The quantity of reserves that is in place is the quantity that can be estimated by different methods, I believe you have testified one of them is the volumetric?

A Volumetric method is all I have testified.

Q Way of estimating the reserves. Actually in practice, it is possible to recover only a portion of those reserves, isn't it?

A Of the reserves in places, yes, sir.

Q So that the net recoverable reserves are not necessarily, in fact would be less than the necessary reserves in place?

A The net recoverable reserves would be less than the reserves in place.

Q And one of the factors which makes reserves recoverable is the permeability that exists through fractures, whether existing in the structure or made by man, isn't it? A Yes, sir.

Q There will be more net recoverable reserves in an area which by reason of fractures there is movement of gas into the well bore?

A Are we sticking time on here now?

Q No, I am just saying that --

A (Interrupting) Then, I say no, sir, there will not be.

Q In your opinion the well that has a fracture area around it in which there is a surface that the rock touches in many places

there and feeds into the well bore, will not produce a larger percentage of those reserves than one without those fractures?

A An infinite time, no.

Q What would be the period of time?

A I don't know.

Q You don't know? A No.

Q Whether or not it would be economical to produce all of those reserves in the absence of either God-made or man-made fractures, you wouldn't purport to say?

A In the absence of God-made or man-made fractures. I think in the absence of God-made or man-made we wouldn't be developing the San Juan Basin, any of it.

Q The result that has taken place has resulted in all but one well being fractured by shooting or by the sand-frac method?

A That has been the customary, I could think of only one well that I wasn't sure was either shot or sand-frac.

Q So insofar as the man-made provisions, those wells are all substantially on the same basis. They have all used one or the other of the accepted methods of making fractures around the well bore?

A With some degree of efficiency, they have. Yes.

Q The greatest percentage of increase resulting from either shooting a well or sand-fracting a well is with the wells that are small initially, isn't it? A I imagine so.

Q You sited one well that I believe had an I.P. of somewhere around 150,000 that your testimony showed had been increased twenty-fold?

A Yes, sir. The El Paso No. 3 J. Howell.

Q Do you know of any well that had an initial potential of two

million that has been increased 40 million?

A I do not know that here, no, sir. I would have to check.

Q That would be such an unusual thing in the field you would, probably would have noticed it, wouldn't you, Mr. Barry?

A No, sir.

Q You mean that 40 million foot wells are commonplace up there?

A What I mean, I know there is few 40 million foot, 40 million foot wells. 30 is more --

Q (Interrupting) You haven't looked up to see what they were, naturally?

A No, sir.

Q As a matter of fact, with your own experience and your own company haven't you discovered that if the well has a good natural flow test that the percentage of increase generally is less by reason of shooting and sand-fracing than the well that has the low natural flow?

A I haven't observed that, no.

Q You haven't made a study on that point?

A I haven't made a study.

Q With reference to the eight wells that you took cores, I notice there is one well, the Indian well, which is outside the line that you give as the boundary of the Mesaverde production. I would assume from that either that the well was a dry hole or non-commercial?

A The well, the Indian 1-A was completed with a small I. P. and made a little bit of water. I did not feel that I wished to extend my limits over beyond that well. It was drilled, well mud could be a mechanical happenstance, but I felt that I was conservative by keeping the limits of production inside of that well until we had further development.

Q So that so far as you are concerned, you wouldn't count that well as being an extension of the field at the present time, or commerical well?

A That well was completed at the time that I put the limit on there, so it was before that.

Q I believe the San Juan 328 Mesa 2-29 was another well that you testified about, wasn't it? A Yes, sir.

Q Has that well been completed?

A I don't believe it has been officially tested, no, sir.

Q The San Juan 3727, the Mesaverde No. 8 was another, I believe? A That is right.

Q That was plugged back to the Fruitland and not productive in the Mesaverde, wasn't it?

A It was a mechanical failure in the Mesaverde, we have drilled another well in another section and successfully completed a commercial well. It was drilled with mud.

Q The 35-5 unit, Mesa unit 1-22, do you recall what the initial potential was on that well when it was completed?

A I do not. It was drilled with mud. I don't expect it to have been as high as if it had been drilled with gas.

Q Would you say that probably 2,800 potential was somewhere around high?

A If that is your figure I will accept it.

Q Assume it that the figure was copied from the Commission records.

A It was a small well. It was drilled with mud rather than gas.

Q Your Indian 1-A Well is, I believe, another one that was cored?

A That had an initial potential, I believe, of 426,000.

Q That is the one we were talking about just a minute ago? Is that the Indian 1-A which is outside?

A Yes.

Q What about Indian C?

A It was drilled with mud, cored, it is outside too.

Q So that --

A (Interrupting) Temporarily plugged and abandoned.

Q So that at least four or five of those wells are wells that are either non-productive for one reason or another, or hardly counted as commercial wells, is that correct?

A Non-productive or hardly counted as commercial wells?

Q Yes.

A Well, we have gone over them and I have told you what the status of each one is. The C-1 is plugged, the A-1 is a producer, small producing well, the 229 has not been tested, the 1-B was a mechanical failure. I think it is obvious that what you say is true.

Q The studies which you made with reference to reserves covering some 440,000 acres, of course, included acreage that other people owned that was checkerboarded along with that of Phillips?

A It was the total gross acreage in those units.

Q You studied generally the northeastern and eastern fringe of the field there?

A I studied the northeastern and the eastern half of the field, would be better than the fringe.

Q Generally speaking, as you approached the flanks or the edges of the field, the potentials and deliverability of the wells are lower, isn't it?

A Generally speaking, no. The potentials or deliverabilities of some of the wells in the middle of the field are just as low as the wells on the outside.

MR. FOSTER: Lower.

A Lower too.

Q I believe on your Isopachus map you showed some areas that you call sink holes. What do you mean by that?

A I mean that for a small area the thickness was less than the surrounding well.

Q That is that within the center of the field there would be places in which you would have thin sand sections, relatively thin sand sections?

A No, sir, I wouldn't say that. For example, a general term I use as sink hole, I point to an area of one well.

MR. FOSTER: Where is that?

A In Section 13 of 30 North, 9 West. Which is geographically about in the center of the field. That well has, by my calculations, has 220 feet of gross sand. Immediately surrounding that each well has better than 250 feet. Since this is a 50 foot contour map, I have to show that that area is slightly less than 250. It is not thin only in the fact that it has got 30 feet less than the next well to it.

Q It is thinner than the sand surrounding it?

A Yes. But it is not the thin, well I wouldn't call it thin, 220 feet. It is 30 foot thinner than the ones around it.

Q There are various spots throughout the entire field in which you find areas in which sands are thicker than surrounding sands, and areas in which sands are thinner than surrounding sands, isn't that true?

A It varies from one to three and a half throughout the field.

Q And the depth of the sand generally tends to be thicker toward the center and northeastern portion of the field than it does towards the flanks, is that correct?

A I don't know what you mean by depth of it. The thickness of the sands tends to be thicker toward, I have lost you toward where?

Q I said, the central and northeastern portions of the field.

A That is pretty broad. I have the intervals of 220 foot and greater thicknesses.

MR. FOSTER: Locate yourself on the map.

A Generally in the south half of Township 31 North, 10 West, North half Township 30 North, 10 West, all of Townsship 30 North, 9 West, South half of 30 north, 8 West. North half of 29 North, 8 West extending then into the West half of 29 North, 7 West and 28 North, 7 West. Generally in that area all of 250 feet gross sand thickness or better. That is the thickest part. Now, that isn't the Northeastern part as you so described it. It just seems to generally run through there.

Q What interval did you use on your contour lines, 50 foot?

A Yes, sir.

Q And the map is drawn showing the variations of 50 feet?

A Yes, sir.

MR. HOWELL: That is all. Thank you, Mr. Barry.

MR. SPURRIER: Anyone else have a question of Mr. Barry?

MR. GRENIER: I have got one.

By MR. GRENIER:

Q Mr. Barry, in the course of your studies, have you attempted to arrive at an average sand thickness through either the field as

delineated by you on the map as of last August, or in this 400 odd thousand acres which you studied?

A Yes, sir, that has to come as an average of, the average, pardon me, did you ask for sand count or pay thickness?

Q Either one.

A The average sand count perimeter of the Phillip's portion was 176 feet. Perimiter.

Q 107.6?

A 176, that is the weight by the amount of acreage in each unit which we buy the percentage that we have in that unit.

Q Did you attempt to arrive at any such average for the field as a whole or for the remainder of this 44,000 acres which you said were under your study, and which were not particularly Phillips acreage?

A The average sand thickness of the entire field including Phillips 195 feet.

Q Are these figures which you have given me on the same basis as the Isopachus lines --

A (Interrupting) Yes.

Q Same as shown on your map?

A Gross sand.

Q This is gross sand count. What is the variance from that average either upward or downward, which you encountered as far as individual portions of acreage are concerned?

A Testified this morning, I believe, that the lowest well was 98.

Q That would be about half of the average then, is that correct, for the field as a whole?

A Approximately half, slightly more than half.

Q The maximum was --

A (Interrupting) 328, I believe.

Q I had a figure of 353, I don't know where I got that. That then, is about 75 percent over?

A Your 353, or which figure are we talking about now?

Q Well, we are about down to 328, that relationship is --

MR. FOSTER: (Interrupting) We are not back down there. We have never been above it.

A I accept your records.

Q Do you have any opinion, Mr. Barry, as to whether or not this is a continuous reservoir? A Yes, sir, I believe it is.

Q You believe it is, you have an opinion and your opinion is that it is a continuous reservoir? A Yes.

Q Despite the mixed up character of the formations that you have testified to?

A I testified to their mixed up nature only as that it was not a uniform thickness of good porosity and uniform thickness of, layers of or beds of uniformly good porosity and poor porosity. I didn't intend that there wasn't an inter-connection between all those beds.

Q Yesterday we heard Mr. Gorham testifying that it was very difficult, if not impossible, to trace individual producing sand members from one well to the next. Would that lack of traceability be of importance in your mind as far as the validity of this opinion of yours that they are all inter-connected?

A It is a difficult problem I will agree with the gentleman, but I think it can be done on the Monafee sand members.

Q You indicated that the fracturing which you found, and the cores you examined were both horizontal and vertical?

A Yes, sir.

Q Would the presence of vertical fracturing tend to assist in the flow from one well to the next, or one location to the next, of gas so as to permit greater interflow of gas from one drill site to the next?

A If it extended across there, yes, sir. It would provide a conduit bed whether vertical or horizontal to the other layer.

Q So that the vertical fractures would assist in letting gas move between the more important horizontal ones. We might --

A (Interrupting) The vertical fractures would assist the gas to move to them, then vertically to a horizontal fracture, or conduit bed, which I described as being higher porosity and thence to the well.

MR. GRENIER: That is all.

MR. SPURRIER: Anyone else. Mr. Arnold.

MR. ARNOLD: I have a question.

By MR. ARNOLD:

Q I believe you said that you correlated the gamma ray logs with the core?

A Yes, sir, I prepared core graphs. That is, I plotted the core analysis alongside the gamma ray neutron, gamma ray induction, all the types of logs I had on the cored wells.

Q You arrived at a line on the gamma ray induction log one side which you counted net sand and the other side you threw out?

A That is right.

Q Do you know about what the actual value on the induction log would have been?

A On the induction log. I could find no correlation on my induction log with my correlation.

Q The line was on the gamma ray log?

A It was on the gamma ray log.

Q About where did it fall on the gamma ray?

A It fell close to 50 percent. I used on wells where I did not have cores between 40 and 50 percent, being a little bit conservative, but on the cored wells, it fell about 50 percent of the distance between the average shale line and the maximum, the minimum gamma ray reflection.

MR. ARNOLD: Thank you.

MR. MAXWELL: Mr. Maxwell with Pubco. I have a question.

By MR. MAXWELL:

Q Are you aware of the different sensitivity used on gamma ray neutron logging units throughout the basin?

A I am very aware of it.

Q Did you take that into account in your study?

A Yes, sir.

Q What did it show with respect to your shales interbedded with your sand? In other words, would a low sensitivity deaden your shales and tend to mask the shales as sand?

A Your small stringers of sands in this reservoir are almost impossible to delineate without a core analysis. All we obtained from a correlation was gamma ray logs are the thicker sand bodies.

Q So it is possible to have interbedded shales that were counted as net sand, but actually were shales?

A No, I didn't say that. I said in the sections where you had thin, relatively thin sands it is impossible to count them, and they are not counted in this.

Q How about in your thick sand sections, could you have thin

shale beds that were counted as sands --

A (Interrupting) I don't believe I have, no, sir. I am speaking mainly of the interbed shales and sands in the Menefee section.

Q Are you aware that there are quite a number of high productivity wells in the basin that have not been stimulated by shot or acid or --

A (Interrupting) I recalled of one in my mind this morning. I don't know of any other.

Q I believe there are four that Pubco has an interest in in the basin, the Turner State 1 was not stimulated. Pubco State 16 was not stimulated.

A That was the one. I did not know that.

Q Another one of high revenue and fairly good I. P. and deliverability was Pubco Hamilton Federal 2.

MR. GRENIER: What is the question?

MR. MAXWELL: I was questioning the witness if he had --

A (Interrupting) I did not know that. I said I remembered only one well that was not shot.

MR. MAXWELL: Thank you.

MR. SPURRIER: Anyone else?

MR. SELINGER: May I ask a question or two, please?

By MR. SELINGER:

Q Mr. Barry, I believe this morning you gave some illustrations of the artificial stimulation by shooting or frading of wells and you mentioned, I believe, two or three. I want to ask you as a reservoir engineer, is the ability of those wells to produce after the shot or fracture related in any way with the reserves of those wells?

A I do not believe it is, no.

Q Also this morning you testified at great length about reserves from the outset, I would like to ask you when you talk about reserves, are you talking about reserves in place or recoverable reserves? A Recoverable reserves.

Q You are talking about recoverable reserves?

A Yes.

Q In your study as a reservoir engineer of this field, are there any variations in reserves anywheres in the field that reach a ratio of as much as 33 to 1? A No.

Q In your study as a reservoir engineer, are there any variations in reserves that reach as much as 12 to 1?

A No, sir.

Q As a matter of fact, you testified this morning that in your study from the data that you have available, that in your opinion the reserves did not vary more than three to one anywhere in the field?

A Yes, sir, that was corrected.

Q To three and a half? A To three and a half.

Q So with that correction, nowhere in the entire reservoir there from the information that you have secured, from the data that you have available as a reservoir engineer, there is no variation of reserves anywhere in that field greater than three and a half to one?

A No.

MR. SELINGER: That is all.

MR. SPURRIER: Mr. Utz.

By MR. UTZ:

Q Mr. Barry, I think you answered this question, but I wasn't entirely clear. In your opinion the fracturing in cores that you

studied, did you contribute any additional reserves under that acreage due to fracturing? A No, sir.

Q On your Isopachus map up there, or your reserve studies if you have them, what do you believe the maximum variation is between offset wells as to either gross sand, net sand or reserves?

A The greatest difference between offset wells that I know of after a study of the Isopachus map, is between the well located in Section 5, 29 North, 8 West, which has 211 feet of sand count and the well located in Section 7, 29 North, 8 West which has a sand count of 351 feet.

Q 351?

A 351. Those wells are about a half a mile apart.

Q That is the variation considerably less than one to two, isn't it?

A Yes, sir. The relationship is two to three and a half.

Q You may have answered this question, I believe it was asked of you shortly before lunch. I was busy and didn't get back right after lunch. I believe you were asked if a high maintained or a consistently high deliverability necessarily meant a high reserve.

A I think all the evidence indicates that it does not. That high deliverability does not indicate high reserve.

Q Do you have an opinion as to why a well with a consistently high deliverability would maintain that high deliverability?

A Deliverability depends on pressure. If there is enough reserves there through your production, you don't reduce the pressure very much, why your deliverability won't be reduced.

Q But if it didn't have the reserve, still maintained a high deliverability, why would it do it?

A It must be draining from a larger area.

MR. UTZ: That is all I have.

MR. SPURRIER: Mr. Maxwell, may I have a list of those non-stimulated wells?

MR. MAXWELL: Hamilton Federal 2. Pubco State 18, Turner State 1, the other one I never did --

MR. SPURRIER: You got cut off.

A It is not in the basin proper, it is our Russell No. 1 which I don't believe we could call stimulated. It is in the Mesaverde formation. It is not in the Blanco-Mesaverde Pool.

MR. McGRATH: Oil and gas Lamb No. 1, it is in Section 21.

MR. SPURRIER: Is that Glenn River?

MR. McGRATH: Wood River.

MR. WEIDERKEHR: Southern Union.

MR. SPURRIER: Any one else have a question of Mr. Barry?

MR. FOSTER: I have one on re-direct examination, if I might.

MR. MACEY: Would you wait for me?

By MR. MACEY:

Q In connection with the data which you used to determine the average porosity and the average connate water and so forth in the field, as I understand it, you used eight, the cores from eight Phillips wells, is that correct? A Yes.

Q Do you know off-hand how many wells in the field have been cored, the total number?

A I haven't got the figure. I would say probably somewhere in the neighborhood of twelve wells other than our eight. I could be wrong.

Q In addition to your eight, how many other wells did you use

core data on?

A The purpose of my report was to prepare the reserves of Phillips. I used only the Phillips wells because they were the only wells on that acreage. I carried the thing across the field with that correlation. Later I checked on the core analysis of other wells in the western portion of the field. Their porosity, connate water and permeability characteristics were similar to those which we had. Therefore, I concluded that the formation did not change. But it was just a general summary.

Q How many were there, that is what I am trying to determine? Can you hazard a guess or do you know the exact figure?

A I believe there were only four that I felt I could rely on. There were others that I had, but for other reasons, why I didn't care to use them.

Q In other words, as I understand it, you hazarded an opinion that there were twenty wells in the field that had been cored and you had access to the information on twelve of those twenty wells?

A Yes, sir.

Q If you thought that the information was applicable and could be used in your study, you used the other information, is that correct?

A I did not use those other wells. I just checked and found that they were just like the ones that I was using.

Q Did you find any trend as to the variation in connate water content? Did it make any rhyme or reason as to its location from a structural standpoint or thickness or anything?

A No, sir.

MR. MACEY: That is all I have.

MR. SPURRIER: Anyone else?

MR. JONES: Rees Jones, representing Delhi.

By MR. JONES:

Q Mr. Barry, as I understand it, in preparing this Isopachus map you were interested in determining reserves of Phillips, is that correct?

A That was the job that I started out on, to find out what Phillips reserves were.

Q And you just went on through the field using Phillip's cores, is that right?

A Using the correlation that I obtained from Phillip's cores, yes, sir.

Q If Delhi Oil Corporation, for example, had requested that you make a study of its reserves, would you have been content to rely on this map?

A Could you provide me with any core analysis of your wells?

Q My question is, would you have relied on this map?

A Sir, you asked me if I was going to make a reserve estimate for you people. I would first ask you to give me everything you got on your wells.

Q That is the answer I wanted. You would have been interested in knowing whether or not Delhi had any cores, is that correct?

A Correct.

Q Then you would have, in effect, have been saying that perhaps taking the average of the Phillip's cores would not have been proper throughout the field, is that not correct?

A I am not saying that, no, sir.

Q You would have been interested in knowing if we hadgamma ray logs?

A I have your gamma ray logs. I have everything but your core analysis.

Q You have logs on all of the wells?

A I have gamma ray logs on all the wells that have been released to West Texas Log Service, or the log service in Denver. That includes a majority of the wells, yes, sir.

Q Then your answer to my initial question as to whether or not if Delhi Oil Corporation had asked you to determine its reserves, is that you would not have been content to rely on this map on the wall, Phillip's Exhibit No. 1?

A I wouldn't have had that map. What I mean--

Q Speaking of August 1, 1953, Mr. Barry, at that time would you have relied on this map?

A I would rely upon the data I have, and the only data that I have would have made up the map, yes, I would have relied on the map.

Q Even though the map was principally prepared to determine the reserves of Phillips?

A There was no other data available and I would have to use it.

Q Was the map prepared for introduction before the Oil Conservation Commission of this State? A It was not.

Q Was it prepared for introduction before the F.P.C.?

A It was not.

Q Why was it prepared?

A It was my duty to prepare reserve estimates and my company made them.

MR. JONES: Thank you.

MR. SPURRIER: Anyone else? If no further questions, the witness may be excused. Just a moment, we have a little re-direct from

your own counsel.

MR. FOSTER: I promised to put into the record here the reserves per acre. That is a matter just of computation. I was asked by one or two if I would do it. I want to do that.

RE-DIRECT EXAMINATION

By MR. FOSTER:

MR. FOSTER: I would like to offer the Exhibit No. 1 in evidence at that time.

MR. SPURRIER: Is there objection? Without objection it will be admitted.

Q Mr. Barry, have you computed the average reserves per acre in the San Juna Basin? A Yes, sir.

Q What do you find that to be?

A 23,400,000 cubic feet per acre.

Q Per acre? A Yes, sir.

Q Have you computed Phillip's reserves per acre under its holdings? A Yes.

Q What do you find that to be?

A I find that to be 21,120 M.C.F. per acre.

MR. FOSTER: Thank you.

MR. SPURRIER: Anyone else?

MR. UTZ: One more question.

By MR. UTZ:

Q This 23,400,000, was that for the entire Blanco-Mesaverde Pool as designated by the Oil Conservation Commission?

A That is for the entire area within my estimated limits of proved production.

Q The heavy line as shown on your exhibit?

A Yes.

MR. GRENIER: Are those recoverable reserves?

A Yes.

Q To what abandonment pressure? A Five hundred pounds.

MR. GRENIER: That is all.

MR. SPURRIER: We will take a short recess.

(Recess.) (Witness excused.)

MR. SPURRIER: The meeting will come to order. Mr. Foster, before you continue, may I make an announcement on Case 729 on which Mr. Lock moved for continuance? We will continue that case to the regular July hearing which I believe is July 15.

Judge Foster.

M. H. C U L L E N D E R

having first been duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. FOSTER:

Q Will you state your name to the Commission, please?

A M. H. Cullender.

Q Where do you reside, Mr. Cullender?

A Bartlesville, Oklahoma.

Q By whom employed? A Phillips Petroleum Company.

Q In what capacity?

A As an assistant to the Chief Production Engineer, the Natural Gas Department.

Q What are your duties in the capacity that you have stated, Mr. Cullender?

A I direct and supervise the various employees in the production engineering section of the Natural Gas Department, concerned

with the operation and production, and performance of the wells assigned to the Natural Gas Department.

Q Will you state your general educational background and your professional experience for the record?

A I graduated in 1939 with a B. S. degree in mathematics from West Texas State College at Canyon, Texas, was employed immediately thereafter by Phillips Petroleum Company where I worked in various gasoline plants, and until 1947, 1947 I went to the Oklahoma-Texas Hugoton area to direct the work of a group of testers engaged in gathering performance data in the Hugoton and Oklahoma and Texas Hugoton fields. In 1948 I went to the Production Engineering Section in Bartlesville where I have since been employed, and in June of 1950 I became the Assistant to the Chief Production Engineer of that department. Since 1950 I have been generally engaged in working on performance of gas wells and working with proration formulas with various State Commission bodies.

Q Over how long a period of time, just for the record, has your experience extended?

A I didn't understand.

Q Over how long a period of time has your experience extended?

A With respect to the performance of gas wells, since February of 1947.

Q In making studies of the performance of gas wells generally, what do you do, what field of information and activity do you cover and study and investigate?

A We are concerned mainly with the rates of flow and the pressures at which those rates occur at various time intervals from shut-in conditions of the wells that we operate, and also with the projected

performance of those wells as that projection is integrated into design of field systems and as the information is incorporated into correlations of one kind or another concerned with the performance or proration necessary for various fields.

Q Over how long a period of time has your experience extended in studying the applicable formulas under varying conditions in different gas fields that should be applied in prorating gas?

A Well, the first time that I had anything to do with an allocation formula, I believe was in 1948 with respect to doing some work on the original case for Texas Hugoton Field. Also the West Panhandle Field of Texas when they combined the sweet and sour field. Later and through the years I have worked on Texas Hugoton Field, in Oklahoma Hugoton Field as well as others, and in early last year developed a correlation for the Texas Hugoton Field and presented it to the Commission and modified the Texas Hugoton to respect to the slope to be applied to the deliverability test. I also worked up a similar project and presented it to the Oklahoma Corporation Commission and they rejected it.

Q One of them took it and the other didn't?

A Yes.

Q Fifty-fifty. But since 1948 you have been continuously engaged in the matter of studies of scientific nature for the purpose of determining the proper and applicable formulas for the proration of gas, is that true?

A Off and on in those periods. The rest of the time with the performance of the wells.

Q Have you, in your professional pursuits, prepared and delivered any papers to scientific or professional societies on the matter of

proration of gas wells?

A Not on the matter of proration.

Q On well performance, other related matters?

A Yes, sir, I prepared a class, or taught a class, Oklahoma Short Course one year on the application of the back pressure performance curve and the analysis of reservoir performance, and also a year later a similar paper with respect to deliverability. I also delivered to the A.M.I.A. in Dallas last year, a different type of performance test which we call the Isochronal performance method of determining performance characteristics of a gas well.

Q What does that mean?

A It means disturbances of constant duration.

Q Constant time? A Yes, sir.

MR. FOSTER: Anybody got any objection to this witnesses qualifications? Are they acceptable to the Commission?

MR. SPURRIER: Yes, sir.

Q Mr. Cullender, let me ask you when you first became acquainted with the San Juan Basin.

A It was in the latter part of 1952 and early in 1953. We sent three employees that were under my direction to the San Juan Basin to gather information on the wells that Phillips was then drilling in the area.

Q You had never personally been in the field yourself?

A No, sir.

Q But your men that operate under your control and direction and supervision have been?

A Yes, sir, since early 1953.

Q What studies have you made in the San Juan Basin in the area that we have under consideration in these cases?

A I have made studies with respect to the performance of some of the wells in the area, and four or five months ago when a committee of engineers in the San Juan Basin began having meetings concerned with proration of gas in the San Juan Basin, I then started accumulating information on certain other wells in the basin in an attempt to work out some reasonable allocation formula.

Q What has been the nature of the studies of the wells that you have made in the San Juan Basin?

A It has had to do with the performance of those wells under various conditions with respect to pressure and time, and with respect to the various, in an attempt at least to correlate the performance of those wells to some known factor in the reservoir conditions with respect to reservoir conditions.

Q In doing that, have you had in mind the determination of a proper allocation formula to be used in the field in allocating gas as between wells?

A Since about six months ago, yes, when the meetings were begun.

Q Since the engineering committee meetings have started?

A Yes, sir.

Q And what studies have you made in the field for the purpose of making a determination, or making a recommendation to this Committee with respect to the type of formula that should be adopted?

A I studied the effect of the various allocation formulas under consideration with respect to the manner in which they would allocate the market demand among the individual wells, and tried to arrive at some reasonable basis to compare those formulas and arrive

at a recommendation.

Q What type of formulas have you considered in these studies? Just name the formulas, the type of formulas.

A I have considered only the type of formula that is known as the additive type of formula which allocates a certain percent of the market demand to one factor and a certain percent of the market demand to another factor. In the studies that I made with respect to different formulas, I considered only two factors, acreage and deliverability, and allocated the market demand certain percentages of the market demand on the basis of acreage, and the balance of it on the basis of acreage times deliverability.

Q You have considered different and separate formulas for the purpose of making comparisons, have you?

A Yes, sir.

Q What are those formulas?

A First one was 100% acreage times deliverability. The second one was 75% pardon me, 75% acreage times deliverability and 25% acreage. The third one was 50% to acres times deliverability and 50% to acreage. The fourth one was 25% to acres times deliverability and 75% to acreage and the fifth one was 100% acreage.

Q I take it that in the course of your studies, for one reason or another best known to yourself, you have eliminated all of these formulas that you have considered except one?

A Yes, sir.

Q And on that one you will make a recommendation to this Commission, is that correct? A Yes, sir.

Q In your professional capacity, what do you consider to be fundamentally, I am talking about fundamentally what do you consider

to be the problem that we are dealing here with in attempting to determine the limits of the knowledge that we have regarding this field, a proper allocation formula?

A Well, I think the ideal purpose that you start out to obtain is an allocation formula that will insure --

MR. TURNER: (Interrupting) Can the witness talk a little louder? We can't hear him.

A The ideal formula that would assure each operator an opportunity to produce his share of the gas in the field and his share being that ratio of the recoverable reserves under each individual tract as compared to the total reserve, recoverable reserve in the field.

Q In other words, you are saying the ideal situation is if we had the facts, the necessary facts and the information, we could write a formula so that each man would get just exactly the amount of gas that is beneath his tract of land, is that what you are saying?

A Well, he would be given an opportunity to produce it.

Q He would be given an opportunity, and if you applied it and operated the field, he would be given that opportunity?

A Yes.

Q Of course, for very obvious reasons we can't approach the ideal, is that true?

A It is my belief, yes, sir, that you cannot approach it.

Q That is just --

A (Interrupting) Or that you can't reach it.

Q That is just because of lack of information?

A Largely.

Q And our ability, of course, in some instances, to properly

apply the information when we got it? A Yes, sir.

Q What would you consider to be involved fundamentally, just stating the proposition in a formula that can be arrived at, based on the information which we do have?

A Well, that formula should take into account those factors as nearly as possible; in their proper relation they are required to make or to accumulate the reserves in a particular tract. I think you get down to a relative position and you can throw out some of the factors. The ones you need to keep in if possible are area, thickness, that is effective thickness, net porosity and pressure. If those four factors could be properly taken into account in an allocation formula, then I believe that you would approach the ideal condition that we set out to meet.

Q Have you prepared a set of exhibits which you expect to use in presenting to the Commission your suggestion on the adoption of a proper allocation formula for the San Juan Basin?

A Yes, sir.

MR. FOSTER: If the Commission please, I have a set of those that I want to give to the Commission now. We may pass out different ones of them to the Commission and the staff. Give the gentlemen a set of those. Marked Exhibits two through eight.

Q Mr. Cullender, I am going to try and shorten this as much as I can. A Yes, sir.

Q I will ask you to go to the board there and for the record, identify each of the exhibits there beginning with Exhibit No. 2.

A Exhibit No. 2 is a schematic drawing of the Mesaverde sandstones and well bore showing flow of gas in reservoir with well producing. Number 3 is a summary of the data available for those

wells by deliverability tests, with deliverability tests. Number 4 is a curve plotting deliverability versus production data for the Blanco-Mesaverde Pool. Number 5 is a map which is an identical map, or a copy of the map introduced as Exhibit No. 1, on which has been superimposed various ranges of deliverability data. The pink or red colored half sections represent wells with deliverability of less than 500 M.C.F.D. The orange color represents those wells with deliverability from 500 to 599 M.C.F.D. The green color represents those wells with deliverability from 1,000 to 1,099 M.C.F.D. The blue represents those wells with deliverabilities from 2,000 to 2,599 M.C.F.D., and purple represents those wells having a deliverability above three million.

I will explain what those deliverabilities are. Number six is a comparison of the effect of the various allocation formulas. Number 7 is a curve entitled Blanco-Mesaverde Pool and is a comparison of deliverability versus allowable for the various allocation formulas. Number 8 consists of a curve and five tabulations which is the distribution of allowable 320 million cubic feet per day market in the Blanco-Mesaverde Pool. The five tabulations present the data that has been drawn on these curves as A, B, C, D and E.

Q Were all of these Exhibits prepared under your direction and supervision, or by you yourself?

A All but one. That was this schematic drawing, and I was outlining a schematic drawing to the draftsman to show them what it was that I wanted and they told me that someone else in another department had already prepared such an exhibit for another purpose. I went and examined that exhibit and adopted it inasmuch as it represented my ideas of what the situation was with respect to flow.

Q Starting there with Exhibit No. 2 I believe it is, that Exhibit is designed to show what?

A That is designed to give a schematic picture of what can happen in a formation of the Mesa Verde--Blanco-Mesaverde type under producing conditions. It is not intended to be a typical Mesa Verde well with respect to any one well. It is just a general picture of the flow mechanism by which a well drains an area containing gas.

Q What study and information did you make or conduct in preparing that exhibit?

A Well, that exhibit grew in my mind and on paper and in various places out of discussions that were held in the engineering subcommittee, and was also a take off from a similar schematic drawing that had been prepared a number of years back on Texas Hugoton Field.

Q What was the subject of these discussions?

A As to whether or not the gas, the thickness as represented by the gas entries to the well bore were or were not the only areas contributing to sustained production from that well.

Q With respect to that subject, what does this drawing show or illustrate?

A Well, first, the sand body itself has been drawn as being a square or a rectangle at least. It represents a right angle cross section through your well bore. The thickness of the formation is divided off into various sandstone beds with horizontal and vertical fractures with shale beds with vertical fractures, with shaley sand or sandy shale beds with vertical and horizontal fractures, and into three zones over on the right-hand side. Zone A, B and C. Now, with respect to zone B --

Q (Interrupting) Just a minute, could you relate those zones to the San Juan area?

A Well, zone B, I think undoubtedly represents some type of a conduit zone. Either of high permeability or of high fracturing. That is the zone I think you see when you get a temperature log superimposed on a well bore. At the points that you get the low temperature cooling there is no doubt that that is the point the gas is actually entering the well bore.

Q That is where it is coming into the well bore?

A To the well bore. Zones A and B represent other zones that contain gas, but are not contributing much gas directly into the well bore.

Q I believe you said A and B, you mean A and C?

A Yes, sir, A and C.

Q All right.

A In nearly all fields of low permeability we find conduit zones, we found the same zones in the Hugoton Field.

Q When you say conduit zone, what do you mean by that?

A I mean a zone that is relatively higher in permeability to zones above or below it which actually transport the gas to the well bore. Now, this picture here, of course, shows gas coming all the way from the edge of this block through the conduit zone directly into the well bore with gas coming out of zones A and C through fractures or directly into the conduit zone and being taken from there into the well bore. Actually it is doubtful if you would ever get a situation where you would have one continuous conduit bed throughout a very large area. You would probably have one conduit bed in one part of the zone and maybe above or below it and extending

another distance, would be another conduit zone, but the gas can be moved from one of those zones to another and to another until it approaches the well bore.

Q At this point, let me ask you this question, the illustration that you have made there on Exhibit 2, can the conditions that are reflected there be found in the San Juan Basin?

A I believe from what Mr. Barry has told me in various discussions and from the testimony that he put on here today, that those conditions do exist. Now, I didn't make any study to find out if those conditions did exist in the basin myself.

Q But taking the previous testimony that is in this record and predicating it on that?

A Yes, sir, on Mr. Barry's testimony.

Q On Mr. Barry's testimony you find then, that the conditions that are represented here on your Exhibit No. 2 may be applied to the San Juan area? A Yes, sir.

Q Applying it to the San Juan area, what do you find that is happening in that reservoir?

A Well, the thing that we all have to remember is that a well bore is approximately a half a foot in diameter. We are draining an area which in many cases is 320 acres, which has an effective radius of 2,106 feet. By that I mean that a circle with a radius of 2,106 feet would contain 320 acres.

Q The perimeter of that circle would lie on the outer edges of that much acreage?

A Yes. Under conditions of flow completely stabilized, if the draw down area around the well had reached out and reached that limit of drainage, we would have to pass the gas from the total area in

that circle into a hole half a foot in diameter.

Q Into a six inch well bore?

A Now, the area of this 21,000 foot circle is 13,230,000 square feet. The area involved in our well bore is 1-16th of a square foot. We have got to take gas from this large area and bring it into the well bore. Under a radio flow condition such as that you suffer extreme pressure losses immediately surrounding the well bore. Assuming that we have a well in the basin that was completely stabilized with a 1200 pound pressure at 2100 feet from the well bore, and a 600 pound pressure at the well bore, the pressure 500 feet from that well bore would be 1,126 pounds, or pressure loss of only 74 pounds across or from 2100 feet out to 500 feet out. At 100 feet we would have had a total loss of only 183 pounds, or 89 pounds in the last four hundred feet. 100 and 500. We would have had 437 pounds loss in the last 100 feet into the well bore. From this point 100 feet out into the well bore.

Now, it is a well known fact that extreme pressure drops do take place under radio flow conditions, and that relatively smaller pressure drops take place under linear flow conditions. In this area that I was just speaking of, we have lowered the pressure within the outer 1600 feet I believe, within the outer 1,000 feet by 74 pounds. It was the outer 1600 feet, excuse me. From 500 feet out to 2100, the pressure has only been dropped 74 pounds, the drop has occurred essentially on a straight line relationship because the curve has not started to, the gradient, has not started to hook into the well bore.

There is a little bit more pressure drop in the inside portion of that annular area. But if it is assumed that we drop that pressure over the whole area 37 pounds from the 500 feet out to the 1200 feet

and set up the linear flow of gas into this conduit zone over that total area, and assume that no gas at all will be produced into the well bore from zones A and zones C, then we have a pressure gradient of 27, 37 pounds over just a portion of this area now to deliver gas into the conduit zone. Assuming very adverse conditions for that linear flow of gas into the conduit zone of a thickness of 300 feet, in other words.

Q Is that a pay thickness that you are talking about?

A In other words, assume that in zone C was 300 feet thick and that there was a conduit bed along the bottom of that 300 foot section, and assuming an effective permeability of that 300 foot section at 300ths millidarsys --

Q .03?

A .03 millidarsys. The 37 pound pressure drop will deliver from zone B a million five hundred thousand cubic feet of gas a day into the conduit zone.

Now, the conduit zone must transport that gas to the well bore. Now, actually the conduit zones are probably the bottlenecks in our production of gas in the Mesaverde area. Now, the purpose of that exhibit, at least the avowed purpose of it, was to show that those areas contributing gas into a well bore are not necessarily the only area or the only thickness that should be counted in arriving at the recoverable reserves that will be produced over a sustained period of production.

Q Now, your Exhibit 3 is related to Exhibit 2, is that correct?

A No, sir, Exhibit 3 is related to Exhibit 4.

Q What is Exhibit 4?

A I would rather do it the other way. Exhibit 4 is a curve

relating deliverability to production in the Blanco-Mesaverde Pool.

Q I just want to get it identified with respect to Exhibit 3. Now, will you tell us what Exhibit 3 is?

A In attempting to arrive at the results of various allocation formulas in the Blanco-Mesaverde Pool, considering only those factors of acreage and acreage times deliverability, it was necessary to have deliverability tests data on as large a number of wells as possible. In order to get that data we went to the Commission files and obtained the deliverability test data and the I. P. data on all wells which had had deliverability tests reported for the year 1953.

Q How many wells was that in number?

A That was 346 wells. I was looking for that figure here. As I recall it, there were 346 wells for which we had deliverability data.

Q In other words, the information that reflected on Exhibit 3 came from the Commission files and records, is that correct?

A Yes, sir, with certain modifications. The I. P.'s and deliverability tests that went into this average figure was obtained from the Commission files.

Now, the purpose, one purpose of this tabulation was to arrive at a method by which we could estimate, I could estimate deliverability tests on those wells on which, had no deliverability. Now the usual practice on that, I think in the Basin, is to relate I. P. to deliverability by some factor.

Q Did you do that?

A No, sir. That correlation seemed to have some rather wild figures in it and we looked then for another method. We decided,

well, that the production data from the individual wells might reflect to some extent the deliverability of the wells. So for December of 1953 the individual production data for all the wells for which we had production data was tabulated, and the same was done for January and for February. Now, the February production --

Q (Interrupting) What year? A Of 1954.

Q All right.

A The February production figure was converted by a factor of 31 divided by 28 so that the production figure for February would represent a 31 day month so that we could compare it with December and January. It was found that a large number of those wells had quite a fluctuation in production for the three months of December, January, February. So the largest production figure for each of those three months with the February figure being converted as previously stated, was tabulated by the side of the deliverability, and that is the figure that is shown here as production with the note on it "production figure used for each individual well was the maximum production reported for the months of December 1953, January 1954 and February 1954 with the February production being converted by the factor 31 over 28."

Q What is the purpose of this Exhibit, what does it reflect?

A Well, actually the purpose of it was to arrive at, or to show the source of the curve and the data points on Exhibit 4. Actually 3 and 4 are part of the same Exhibit. This information was then separated according, the information with respect to those wells with deliverability tests were separated into deliverability groups as set out in the left-hand column. There were 16 wells from zero to 100 deliverability. That 16 is reflected in column two. Column

3 is the average initial potential. Those initial potentials were averaged as they came off of the records without consideration as to whether there were three or six hour initial potentials. That was --

Q (Interrupting) Do you know whether those potentials were taken with respect to the date of the completion of the well and any shooting or acidizing or sand-fracing of the well?

A No, sir.

Q You do not know that? A No, sir.

Q All right. Is there any way to know it?

A Your files could probably be summarized showing the date that the well was completed and shut and the date the I. P. was taken and the date the deliverability was taken.

Q Now, the next column shows what?

A Column 4 is the average deliverability for the six wells in the group from zero to 163 M.C.F. per day. The average production basis of a 31 day month was shown in Column 5 was 2, 177. For each of those columns each group of wells was separated and summarized as shown in groups of 100 through the largest well in the field.

Q This is average production for 31 day month unregulated, that is what we are talking about, isn't it? It is not a regulated production by the Commission or anything of that sort?

A Well, it is production as it occurred on the wells.

Q Production as it occurred in the field?

A Yes, sir. Now I must point out again that was the maximum production that occurred in any one of the three months. This figure is the average of those maximum figures. If one well produced more gas in December than in January and February, we used that production figure.

Q Yes. Let me call your attention to the last column you have, Mcfd/month.

A Well, will everybody strike the D. That information was plotted on Exhibit No. 4, each one of the data points representing the plot of deliverability versus production, and resulted in the distribution shown.

Q What is that distribution?

A Well, the points there just represent the plotting and the data. There are four points shown there with an X rather than a circle. In drawing the line through the data points as they were set out, I did not lend any weight to those four data points. Those four points are the points represented on the tabulation in Exhibit 3 as a group from seven million one hundred to seven one ninety-nine, representing one well. The second point that was not considered was the value of 98, 9728 versus 87,340. I think the other two are the last two data points. That wasn't a very good thing to do to throw away some of the data that you worked so hard to get. Nevertheless, I couldn't draw a very good straight line through there and take into account those data points. Also in examining the production data on the wells on which we were going to estimate deliverability, it was found that the curve was not going to be used above the deliverability of 5,400,000. It is represented by monthly production at about 106 million.

Q You are not using it beyond the range in which you discarded the points you are speaking about?

A Yes, sir, I am not using the curve beyond the point of 5,400,000 deliverability.

Q The information that you discarded just becomes wholly

immaterial, is that correct?

A I don't think it would have materially affected the answer.

Q All right.

A You may want to know why I thought it was necessary to arrive at estimated deliverabilities for those wells when it is quite possible that they are in error. Because of the fact that the wells were probably not producing under the same conditions, in fact, undoubtedly were not producing under the same conditions, but I felt that it was important to get a distribution of deliverability, a probable distribution of deliverability with respect to all the wells in the field.

Now, I think possibly that the distribution is not upset so much by the estimated deliverabilities, although certain individual deliverabilities may be in error, a certain amount, more or less.

Q Why did you want this estimate of deliverabilities on the wells through that field?

A Because I wanted to apply the various formulas that I was going to consider to the market demand of 320 million cubic feet of gas per day for all the wells now producing in the San Juan Basin. Now the number of wells for which production data was available amounted to 572 wells. That is the number of wells that we used in the study and I think the 346 from that will give 226 wells that are included in this 572 which have estimated deliverabilities. The balance of the exhibits will reflect the result of those deliverabilities in those 572 wells including the estimated deliverabilities.

Q I notice on Exhibit 4 you have deliverability versus production data. What is the significance of that?

A It was just a means by which I could estimate deliverability.

values for those wells that were producing for which I did not have deliverability test data.

Q Now, say that again. I want that in the record. Speak a little louder there.

A The curve was drawn for the purpose of being able to estimate deliverability tests for those wells for which production data were available and for which deliverability data were not available.

Q Were not available. In other words, there are a group of wells in the field on which you don't have any deliverability data?

A Yes, sir.

Q And for the purpose of arriving at some deliverability for those wells you used the production data?

A Yes, sir.

Q In plotting your curve, is that correct?

A Yes, sir.

Q That puts all the wells that you considered, therefore, on a comparable basis for the purpose of applying a gas allocation formula to them, is that it?

A It gives me a figure for each one of the wells that I want to include in the study.

Q That is right. All right, go ahead.

A Exhibit No. 5. This Exhibit 5 is titled "Original Map Base San Juan Basin at Colorado, New Mexico," and is a copy of the map that was entered as Phillip's Exhibit 1 and from which Mr. Barry testified. Added to that I think I went through all that.

Q Yes, you gave the legend and so forth on the map, is that correct?

A San Juan Basin of Colorado and New Mexico.

(Recess.)

MR. SPURRIER: Mr. Foster.

Q Mr. Cullender, will you return there to the map and continue with your explanation of it?

A I think that the map has been identified and I was just starting in to identify it again when we recessed. The map has been colored just to show the variations of deliverability from well to well with respect to the thickness from well to well.

Q What does that show? Just put your finger on some examples.

A Well, I would like to say one thing before that.

Q Yes, sir, go right ahead.

A These colors that are on here represent actual deliverabilities as well as the estimated deliverabilities. Now in all likelihood, it should have been a different kind of a marking or something to show which wells were estimated and which were not. But, nevertheless, it represents a deliverability, I think reasonably well, in line with what the deliverability will be.

Q So I don't get crossed up here myself, may I ask the deliverabilities that you are using on the map, are they the ones that you have determined here by the method that you have testified to?

A The deliverabilities on the map include the 346 actual deliverabilities plus the estimated deliverabilities on the 226 wells.

Q Computed from production?

A Yes, sir, as taken from the correlation curve.

Q Okay.

A Of course, the first thing to do is start looking for some obvious discrepancy in the deliverability with respect to thickness.

Q Can you point out a few for us so the Commission can follow it?

A Well, we will take a case right here in Section 29, of 31 and 9 and we have a well located in the east half of that section with a deliverability in excess of three million. In the west half of that section is a well with a deliverability of less than three hundred thousand M.C.F. per day. In section 22, of 30 and 8.

Q What is the pay thickness shown there on the two wells that you have just testified about?

A The well, I can't find it now. I think I am really fouled up because I think I called that Section 29 and it is not Section 29.

Q It is hard to read the Section numbers with those colors on there.

A That is Section 26 of 31 and 9 or in the east half, has a deliverability in excess of three million. The well in the west half has a deliverability of less than three hundred thousand. Those wells are both practically on the 250 foot contour line.

Q Let's get down a little bit. That is a ratio of about what in the deliverabilities?

A Well, it is at least --

Q (Interrupting) --ten to one, in the order of ten to one?

A It is at least six to one because I think I said less than three million. It is less than five million and greater than three million. It is at least six to one.

Q At least six to one with the same pay thickness indicated for both wells? A Yes, sir.

A Now, we continue to pick examples in Section 21 of 30 and 9, there is a well in the east half of the section with an excess of three million in the west half less than five hundred thousand.

Q A ratio of what?

A A ratio of in excess of six to one.

Q Both wells have the same pay thickness indication?

A Yes, sir.

Q How far apart are the two wells that you have just testified about?

A One is located in the northeast quarter of the section and one is located in the southwest quarter.

Q I mean the first two wells that you made a comparison of with respect to the last two wells, by what distance are they separated?

A Oh, about seven or eight miles.

Q Can you give us some more of those illustrations?

A Well, I might take a little larger area.

Q All right.

A Here is an area in Sections 19, 23, 29, and 30 of 30 and 9 wherein we have a group of wells completely within a three hundred foot contour.

Q All right.

A There are one, two, three, four, five, six wells located in that contour. Three of the wells --

Q (Interrupting) That is a pay contour, isn't it?

A Yes, sir.

Q All right.

A Three of the wells have deliverability of less than a half a million, one of the wells has a deliverability between one million and one million nine hundred ninety-nine thousand. One well has a deliverability in the range five hundred to nine nine nine.

Q What is the range in the variation in deliverabilities between the wells in that three hundred contour line?

A Well, from, of at least four to one.

Q Four to one? A Yes, sir.

Q Let me ask you this question right there. If deliverability of the well is an indication of reserves, would you expect to find the situation there that you have pointed out in that three hundred foot contour line? A No, sir.

Q If that relationship between the deliverability of the wells and the reserves, if there was a relationship between the range of deliverabilities of the wells and the reserves, what would you expect to find within the inclosure of that three hundred pound, three hundred foot contour line?

A Expect to find wells of practically equal deliverability.

Q Equal deliverability. Let me ask you without pointing any more of these examples, does this variation that you have pointed out between the deliverability ranges of wells and the pay thickness obtained throughout the entire area. In other words, did you find?

A Did you finish that question?

Q Do you find the same situation obtaining that you have just pointed out, not only where you have found it there, but you find it generally obtaining throughout the whole area?

A Yes, I think if you will go on here anywhere you see two different colors, particularly if there is much difference in those colors with respect to the color range in the legend, you have a condition that we have been talking about most likely.

Q What I am trying to find out, this condition doesn't exist just with respect to that particular portion of the field. It exists generally with respect to the field as a whole, does it not?

A Yes, sir.

Q In your profession, would you say that this is proof that there is not a relationship between the deliverability of the wells and the reserves in place?

A That was the purpose for which it was prepared, yes.

Q It does illustrate that --

A (Interrupting) Yes.

Q It does illustrate that that relationship does not exist?

A Yes.

Q That is not something that is just peculiar to the San Juan Basin is it?

A No, sir.

Q That would be true, I don't care what basin it is?

A I think undoubtedly it is true anywhere.

Q Any place in trying to effect deliverability to reserve, is that correct, is it not?

A Yes. We have never found an area where there was a direct relationship between deliverability and reserves. In fact, any relationship that you arrive at however slight, is usually very rough.

Q Yes. Have you said about all you want to say about Exhibit 5?

A For the time being, yes, sir.

Q Now, Exhibit 6, will you explain that to us?

A Exhibit 6 is a tabulation representing the results obtained by application of the five formulas to a market demand of 320 million cubic feet of gas per day.

Q Why do you use 320 million?

A That figure was furnished to the engineering committee that was working on an allocation formula, that was considering an allocation formula for the San Juan Basin as estimating the best estimate of El Paso and Southern Union as to what the market demand in the

area would be for the ensuing year.

Q Are the El Paso and Southern Union the principal market outlet for the field --

A (Interrupting) Yes, sir.

Q (Continuing) -- at this time? A Yes, sir.

Q Pardon me, I had to get that in.

A Column one is a description representing the factors for, the allocation factors for one hundred percent times acreage.

Q While you are mentioning that one hundred percent acreage times deliverability, on what basis is the field being presently operated?

A It is being produced so far as I can determine, by allowing the wells to flow into the pipeline as they are able to.

Q Does that represent approximately acres times deliverability?

A If all the wells were operating under the same pipeline pressures, you would probably approach a formula of 100 percent deliverability.

Q That is illustrated there on Exhibit No. 3, isn't it?

A To a certain extent it shows that on the average there is a deviation from that situation, actually.

Q You are down on four, I believe, which is --

A (Interrupting) Okay.

Q The same information is reflected on each one.

A May I use four?

Q You may use four if you like.

A If the wells had been operating on exactly a deliverability formula, this line would have had a slope of one. In other words, if it crossed the bottom cycle at three or at a production of 1,000, a

deliverability of 30, it would have crossed the cycle at ten million cubic feet, or ten thousand M.C.F.D. at three hundred M.C.F.D. deliverability, and so on for each cycle it would have gone through the three orders which you can see there, a little deviation on the average that at least, as I drew the cruve, the lower capacity wells are operating a little nearer 100% deliverability than the higher capacity wells.

Q You just arrive at it if you aren't there, that is what you are saying, isn't it? A On the average.

Q That is reflected on both Exhibit 3 and 4?

A Yes.

Q All right. That is unregulated in the field. There is no formula in the field that permits those wells to operate that way?

A No, sir.

Q Just as to that, they are just operating now unregulated?

A Yes, sir.

Q Go ahead.

A Column two represents the various factors for the formula, 25% acreage and 75% acreage times deliverability.

Q When you say represents the various factors, can you name those factors?

A Yes, I intend to compare them, each, one by one.

Q Very well. A As we go along.

Q All right.

A The next column which is a third row of figures, actually it is column four, in the tabulation represents the various factors determined by allocating one-half of the market on the basis of acreage and one-half of it on the basis of acreage times deliverability.

The next column being column five represents the same factors for the formula 75% acreage and 25% acreage times deliverability. So, on the last column represents the figures for 100% acreage and 0% acreage times deliverability.

The first heading under description is acreage factor. In this study it was assumed that all wells had 320 acres assigned to them. While this is not actually the case with respect to a few wells, I think on short sections it generally represents the acreage assignment that would be assigned to the wells under an allocation formula, and the factor has been presented on the basis of 320 acres.

Q In other words, there is not enough variation from 320 to make any material difference in your factor?

A Not in the factors. With respect to the allowable of any individual well, of course, it would increase or decrease that allowable in proportion to the acreage assigned to the well, assuming it was not a limited well. Under that, that factor under the formula number one, there would be no acreage factor because none of the allowable would be allocated to acreage. Under the 25% acreage formula the allowable would be 186.1407. Actually that is 186 M.C.F.D. of gas per day assigned to that well on the basis of acreage.

Under the 50-50 formula, the acreage factor is 414.8525. 75, 25 formula. The acreage factor is 644.6538. Under the 100% acreage factor it is 864.4391. Before going into the deliverability factor, I would like to skip that for the moment and go to the third item under description, which is limiting deliverability. That limiting deliverability is the deliverability of a well which would have an allowable under the formula exactly equal to its deliverability after having re-allocated all allowables assigned in excess of a wells

deliverability. By that I mean we first applied the factors to all the wells and then assumed that the wells were not capable of delivering gas in excess of their deliverability, and then re-allocated to find the final factors.

Now, actually it might seem by that that I would recommend to the Commission that they not assign allowables in excess of deliverability. Instead, I would recommend to them that they not assign allowables in excess of deliverability unless it could be shown that the well could produce the additional gas that would be assigned to it.

Q Of course that can be found out by its production history?

A Yes, sir, but to avoid assigning excessive allowables and waiting three or four months to find out what gas should be cancelled and allocated back, I would recommend that they first allocate anything back in excess of the deliverability, then if it was shown that a well could deliver gas in excess of its deliverability, that the allowable be raised to that value, limited only by the allowable assigned by the factors in the formula.

Q Yes, limited there, you are saying only by the proportional part of the total field market demand it would get under the applicable formula? A Yes, sir.

Q Okay.

A Now, the deliverability factor represents the factor which would be multiplied times deliverability to determine the allowable for each individual well assigned on the basis of deliverability. Now, under the formula one, 100% acres times deliverability, that factor is point five, six, nine, three, six, two, one, (0.5693621) which means nothing more than that the fact that the 320 M.C.F. per day is 56.93% of the total deliverability of the 572 wells. There would be

no re-allocation necessary except as might be shown by the inability of the wells to even produce their deliverability.

Q That is the point where you are telling us for all practical purposes that date in allocation of the gas to the wells up there?

A On an average, I think that is right. I think with respect to individual wells, you will find there is a good possibility that is not the case as one well against another.

Q Yes.

A Each of the other factors are set out there under the appropirate column, deliverability factor gets down to .120 under formula four, which is 75% acreage and 25% acres times deliverability.

I have already stated what the limiting deliverability was and come down to the next item which is the number of wells. Under that is the limited wells and the non limited wells.

Q Right there I want to drive a peg, because we all don't want to get confused over the use of these terms. What do you mean by limited and non limited wells?

A As shown in the footnotes, I defined a limited well as being one for which the allowable is equal to the deliverability.

Q That appears right on the face of it to be a little bit contradictory. Can you explain that to me?

A Well, every time --

Q It appears that it wouldn't be a limited well, but it appears to be a little contradictory on the face of it, would you explain that?

A The normal nomenclature for delineating wells in an allocation schedule is either a limited well or a non prorated well or some other designation, setting out that well as being the well whose

allowable is not assigned under the formula, but is limited to some value below what would be assigned under the formula for some reason which is considered necessary to limit that well.

Q In other words, by applying the formula, it is limited in the amount of gas that it can produce?

A No,well, it is limited in the amount of gas that will be assigned to it, the allowable. That is correct. It is limited by some factor other than the allocation factors and to an extent less than the allocation factor.

Q Yes.

A Now, a non limited well is one for which the allowable is less than the deliverability. Actually that well is limited by the allocation factors to its allowable, but it is not limited in its producing capacity.

Q Yes, the allowable is less than its deliverability?

A Yes, sir. Every time that you and I talk about this we get confused, so don't anybody worry about it.

Q I don't get confused, I just stay that way.

A I didn't say you did, I said we did.

Q It is a confusing thing that is the point I want to make, and unless one follows it very carefully, you will get confused and you will draw an erroneous conclusion. That is the point I want to make. Now that we are all fairly confused, will you go ahead?

A Under formula one hundred percent acres times deliverability, there are no limited wells, all wells being assigned an allowable by the allocation formula which is 572 wells. Along with this I will also take up by formulas the next item under the description, which is the percent of the total wells in the field that are limited wells

and the percent that are non limited wells. Under formula one, 100% of the wells are non limited. As defined below. Under formula two we have 181 limited wells and 391 non limited wells, or 31.46 percent of the wells limited, and 68.36 percent not limited. Under formula three have 267 wells limited and 305 wells not limited. Under the percentage, under formula three, the limited wells amount to 46.68 percent of the wells and the non limited amount to 53.32. Under formula four being 75% acreage and 25% acreage times deliverability, there are 312 limited wells and 260 non limited wells for percentages of 54.55 and 45.45 respectively for the non limited wells, Under the formula 100% acreage, we have 342 wells limited and 232 wells not limited. The respective percentages being 59.79 and 40.21.

Going on down to the next two items which will be discussed and considered at the same time, we have the allowable M.C.F. per day assigned to the limited wells and the allowable assigned to the non limited wells and the next item below being the percentage of the wells, the percentage of the allowable assigned to the limited wells and the percentage assigned to the non limited wells. Under formula one, 320,000 M.C.F. per day is assigned to non limited wells, or 100%.

Q Right there may I, just may be a little untimely. Let me ask you this, under this column that you are now talking about, you show 100% allocated to limited and 100% allocated to non limited wells, is that what it says?

A No, sir. We show 100% allocated to wells all of which are not limited by the deliverability.

Q Say that again.

A I say that 100% of the market is limited to wells that are not

limited by their deliverability.

Q Go ahead.

A Under the allocation formula number two, we show 28,876 M.C.F. per day allocated to the limited wells, 201,124 M.C.F. per day allocated to the non limited wells. This amounts to 9.02 percent of the total allocation being made to limited wells and 199, 90.8 percent being limited to non limited wells. Under allocation formula number three, the limited wells were assigned 66,939 M.C.F. per day. The non limited, 253,061 M.C.F. per day for percentages of 20.92 and 79.08. Under formula four the allowable assigned to limited wells was 96,520 M.C.F. to the non limited 223,480 M.C.F. per day for a percentage of the total allowable assigned to limited wells of 30.16 percent and to the non limited wells of the 69.84 percent. Under the final formula 100% acreage, 121,179 M.C.F. per day was assigned to the limited wells with 198,821 M.C.F. per day being assigned to non limited wells for a percentage of 37.87 for the limited wells and 62.13 percent to the non limited wells.

The purpose of preparing such a tabulation is to compare all the way through the various factors and the effects of each of the five allocation formulas.

Q Now, tell me how you can pick out the formula best suited to the field by making this comparison?

A By making this comparison we can arrive at a formula which can possible distribute the gas in say a manner comparable to the distribution of reserves. Now, initially and at this point, you can't very well make a comparison or determination.

Q I understand that.

A With respect to that formula. The purpose was to apply the

formula to the market, make the re-allocation necessary so that we could actually come out and find out what kind of wells we are talking about when we say we are subsidizing these small wells. I want to know which they are. That is the purpose of this and expect to point it out.

I think also a lot of these figures will be kicked around here and just wanted them so that we could kick them around too. At the moment I am through with Exhibit six.

Q All right. Will you explain Exhibit 7 to us?

A Exhibit 7 represents the results of the various factors determined under the various formulas we applied to different size wells with respect to those wells deliverability. We have an allowable in million cubic feet per day on the vertical scale and deliverability in million cubic feet per day on the horizontal scale. By picking out a deliverability for a well and assuming that that well is assigned 320 acres, you can read the allowable from the curve and compare that allowable to the allowable for other wells. The line on the, awhile ago it was pointed out to me that there was an error on this exhibit to the extent that the formulas have been designated as 100% acreage plus deliverability, 25% acreage and 75% acreage plus deliverability, 50% acreage and 50% acreage plus deliverability, and 75% acreage and 25% acreage plus deliverability, each of those plus signs actually should be times, should be acreage times deliverability.

Q Will everyone just correct their exhibit? Put the times factor in place of the plus factor.

A Now, under the assumption that the wells allowable was going to be limited to 100% of deliverability, the line titled one hundred

percent deliverability line was drawn as a dashed line which is a 45 degree slope line through the deliverability and the allowable coordinates. Under the allocation formula, 100% acreage times deliverability, we have the 100% acreage line going off showing the relationship between deliverability and allowable under that allocation formula. We come to the 25% acreage formula and we find that all those wells below approximately 320 M.C.F. per day which correspondsto the figure, actually it was 315, are limited. But they come over here and at a deliverability of approximately 1,200,000 a well would have the same allowable under the allocation formula 100% acreage times deliverability and 25% acreage and 75% acreage times deliverability.

Wells in excess of that deliverability would have less allowable, so it is immediately apparent that we have shifted allowable from wells between 315,000 cubic feet a day deliverability and 1,200,000 cubic feet a day deliverability by increasing the deliverabilities of those wells and decreasing -- the allowable as compared to the 100% acreage times deliverability formula.

Under the 50% acreage and 50% acreage times deliverability formula, all those wells under 557 M.C.F. per day will be assigned their allowable as, their allowable equal to their deliverability. We find that at about a deliverability of 1,330,000 we have the same allowable under a 100% acreage times deliverability as under the 50% acreage and 50% acreage times deliverability.

At approximately 1,440,000 we have the same allowable under the 50-50 formula and the 25% acreage and 75% acreage times deliverability formula. Going next to the allocation formula 75% acreage and 25% acreage times deliverability, we find that all those wells

below 733 M.C.F. per day will be assigned an allowable equal to their deliverability. We find that at approximately 1,440,000 M.C.F., approximately 1,404,000 M.C.F. per day we have the same allowable assigned under the 75% acreage and 25% acreage times deliverability as the 100%. Well, a thousand and four M.C.F. per day.

Q I believe you said 1 million and 4?

A A thousand and four. At about 1,550,000 cubic feet deliverability per day we find that the allocation formula of 75% acreage and 25% acreage times deliverability gives you the same allowable under the 25% acreage and the 75% acreage times deliverability formula.

Q Is that just a coincidence?

A That is just the way the factors worked out. The purpose of it is to show where in the range of deliverability the shifting of allowable occurs under these various allocation formulas.

Q When you say shifting of allowable, you mean that as between wells?

A As between formulas for the same size wells.

Q Yes. I understand.

MR. SPURRIER: Let's recess until nine o'clock in the morning.

(Recess.)

Original
Oil Cons. Dy

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 330-330A Special Hearing

VOLUME III

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TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES
COURT REPORTERS
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MR. SPURRIER: Mr. Foster.

By: MR. FOSTER: (Continued)

Q Mr. Cullender, when we recessed last night, you were explaining Exhibit 7. Will you proceed with your explanation of that Exhibit?

A Well, Exhibit 7 is a series of curves showing the effect of the different formulas on wells of different deliverabilities. It was prepared in order to compare the allowable of various size deliverabilities under the various formulas.

Q You say showing the different effect on wells of different deliverabilities, what do you mean by that?

A Well, a well having a one-million deliverability will have more allowable under certain formulas than others.

Q Or conversely have less?

A Yes, sir. Wells, say of two million deliverability, the same would hold except it would be a different formula on which they would have more allowable or less allowable.

Q Go ahead.

A I think a few points of intersection on these curves will be of interest and benefit in examining these different size wells.

Q If you are going to spot points of intersection on the curves, I will ask you to go to the board there and use a colored pencil to indicate the point of intersection that you are speaking of so that it will graphically appear in the record.

A The first point of intersection of interest is along the one hundred percent deliverability line. The 25 percent acreage formula,

if it is all right with everybody, I will just talk about these formulas with respect to the amount of acreage.

MR. SPURRIER: Just call them by their first--

A (Interrupting) I would like to refer to them all on the basis of acreage.

MR. SPURRIER: Yes.

A The 25 percent acreage formula intersects the one hundred percent deliverability line and deliverability of 315.

Q What does that mean, 315?

A Deliverability of 315,000, the well would be assigned an allowable of 315,000 under the 25 percent acreage formula.

Q Okay.

A Under the fifty percent acreage, the figure is 557,000. Under the 75 percent acreage formula, the limiting deliverability is 733. Under the 100 percent acreage formula, the deliverability is 864,000, Taking the 100 percent acreage times deliverability line the 25 percent acreage formula intersects that line at deliverability of 1165. That means that under a well with a deliverability of 1165 will have the same allowable under the two formulas of 25 percent acreage and zero percent acreage. The 50 percent acreage formula will intersect that line at a deliverability of 1322.

Q That means what;I want it for the record?

A At that point, a well will have deliverability of 1,322,000 will have the same allowable under the 50 percent acreage formula as under the zero percentage formula.

Q When you say zero percent, you mean hundred percent deliverability?

A Hundred percent acreage times deliverability formula. The

75 percent acreage formula will intersect the 100 percent acres times deliverability at a deliverability of 1,435,000.

Q That means what?

A That means that at that point a well of that size will have the same allowable under the two formulas. At 1,518,000 the formula, a well of that size would be the same allowable under the same, under the 100 percent times deliverability acreage and zero acreage formula.

MR. GRENIER: What was the last figure?

A 1,518,000.

MR. GRENIER: Thank you.

A Now, taking the 25 percent acreage formula as the reference line, we already have its point of intersect of 100 percent acreage times deliverability; the 50 percent acreage formula, the allowable will be the same and deliverability of 1,486,000.

Q That means a well with a deliverability of 1,486,000?

A Will have the same allowable under the 50 percent as under the 25 percent acreage formula.

Q Yes.

A Then, taking the 75 percent acreage formula, deliverability of 1,584,000, the two wells will have the same or a well of that size will have the same allowable under both formulas.

Q When you say both formulas, which--

A (Interrupting) Under the 75 percent acreage and the 25 percent acreage formula.

Q All right.

A At a deliverability of 1,656 MCF, a well will have the same allowable under the 100 percent acreage formula as under the 25 percent

acreage formula. Taking the 50 percent acreage line as the reference line, the 75 percent acreage formula will intersect that line at a deliverability of 1,695,000. At that point a well having a deliverability of 1,695,000 will have the same allowable under the 75 percent acreage as the 50 percent acreage formula. At 100 percent acreage--and the 50 percent acreage formula there intersects at a deliverability of 1,759,000. Then, the last point will be the intersection between the 100 percent acreage formula and the 75 percent which is a deliverability of 1,831,000. The thing--

Q (Interrupting) Just a minute. What you have given us there is just mathematics, is it not?

A Yes, sir, that is just where the formulas work out to the same allowable for the same size wells.

Q That is the mathematical significance of that Exhibit?

A Yes, sir. Well, it is just worked out by mathematics. The significance of it is to me that you are not shifting too much allowables from small wells to large wells when you go to 100 percent acreage times deliverability formula as opposed to 100 percent acreage formulas as much as we are shifting allowables from medium sized wells to large wells as you go towards the 100 percent acreage times deliverability.

Q The mathematical significance of it is then that it shows what formulas will shift allowables from wells, is that correct?

A With respect to different sizes of wells.

Q With respect to different size wells, okay. Now, Mr. Cullender, will you explain to us first what Exhibit 8 is?

A That is a comparison of the percent of the total allowables assigned versus the percent of total wells to which that percentage

of total field allowable is assigned under the different formulas, and presents another comparison as to where the shifting of allowable occurs as between different size wells under the different formulas.

Q Is there any relationship between Exhibit 7 and 8?

A Not particularly, no, because this is on the percentage of the total wells as against percent of total allowable where Exhibit 7 has reference to individual well deliverabilities versus the individual wells allowable. I don't think that we need to go into the tables attached to Exhibit 8 other than to explain that each one of those pages is a tabulation of the data points that went into the curves shown on the curve sheet.

Q Yes. Would you tell us how you determined those data points?

A Yes, sir, just for explanation, the one hundred percent of the total allocation on the basis of acreage times deliverability. The allowable was calculated for each of the individual wells using the factors shown on Exhibit 6 and the wells were then arranged in the order of their allowables. In other words, the well with the smallest allowable was placed first, the well with the next allowable was placed second and they were arranged in that order through the 572 wells.

Q You mean by grouping them?

A First they were arranged in order of deliverability beginning with the allowable, excuse me.

Q Allowable, not deliverability?

A The well with the lowest allowable was the first. The well with the highest was the 572nd well. After the cards were arranged they were totaled for each 29 wells. The first line there shows the total for the 29 wells having the smallest allowable in the field

which is 5.07 percent of the total wells. The total deliverability is 941 and the total percent of allowable is 0.17. In this case deliverability was directly related to allowable whereas in the other tables we, the value of cumulative allowable was tabulated and then the percent of allowable arrived at. This curve reflects some information that has been on previous Exhibits. The first point is that 31.64 percent of the wells and that is the percent of limited wells under the 25 percent acreage formula.

Q Let's explain again at this point, what we mean by limited wells?

A A limited well is one in which the allowable is equal to the deliverability.

Q All right.

A When you go from the 25 percent acreage formula to the 50 percent acreage formula, the limited wells will have the same allowable and those wells above that deliverability will be given increased allowables as you put more weight on acreage. The point where the 75 percent acreage formula deviates from the 50 percent acreage is at 46.68 percent of the wells. Where the 100 percent acreage formula deviates from the 75 percent acreage formula is at 64.55 percent of the wells.

Q You are writing those percentage points on the chart, are you?

A Yes, sir, I am.

Q Is that 54 or 64?

A 64.55. Now, curve E is a straight line from about 60 percent of the total wells out to 100 percent of the total wells. The point that is to be made here is to compare what happens over in this end of the curve. Under the 100 percent acreage times deliverability

formula, ten percent of the wells in the field will have 40 percent of the total allowable of the field.

Q Will you repeat that?

A Ten percent of the total wells in the field will have 40 percent of the total allowable for the field.

Q Under what formula?

A The 100 percent acreage times deliverability.

Q All right. Now, relating that to the number of wells in the field, the 572, that means what? That is just interpretive, put it in the record.

A I am not sure--

Q (Interrupting) There are how many wells in the field?

A 572.

Q Ten percent is what? A 57.

Q 57 wells in the field would get 40 percent of--

A (Interrupting) The total allowable.

Q (Continuing)--of the total allowable of what?

A Of 320,000,000 cubic feet per day or any other.--

Q Or any other amount, but you are using the 320?

A Yes, sir, but the percentage would stay the same under the acreage times the deliverability formula.

Q All right.

A Curve B which is the 25 percent acreage formula, that same ten percent of the wells would then have 32 percent of the total allowable for the field. Curve C shows that that ten percent of the wells would have 25 and a half percent of the total allowable of the field. Curve D shows that the largest ten percent of the wells or the ten percent of the wells having the largest deliverability would

have 20 percent of the total allowable in the field.

Q That is the 50 percent formula?

A That is 75 percent acreage.

Q 75 percent acreage?

A Of the 100 percent acreage formula, ten percent of the wells would have 15 percent of the allowable. That is because if all the wells could make their allowable, the ten percent of the wells would have had ten percent of the total allowable. But the reallocation of this volume of gas that could not be produced by the lower capacity wells raised that to the 15 percent.

Q What is the mathematical significance of that Exhibit, Mr. Cullender?

A Well, I don't know whether there is any mathematical significance, it just is a comparison of the distribution of the allowable, and shows the amount of allowable, the percent of the total allowable that is assigned to the larger percent of the wells. Unless there is considerable variation in reserves, it shows that there is not too much weight, should not be put on acres times deliverability.

Q But assuming that there is considerable variation in reserves, where would the weight be?

A Well, the more variation, possibly you might be entitled to more weight to acres times deliverability.

Q I wish you would just state for the record how you proposed to use these Exhibits that you have identified and explained in arriving at what, in your opinion, you consider a proper allocation formula for this field?

A Well, the Exhibits were designed to show the effect of the different allocation formulas with respect to different size wells

so that--

Q (Interrupting) When you say different size wells, what do you mean by that?

A Wells of different deliverability, different size deliverability.

Q All right.

A It was all done to get a distribution pattern of allowable under these formulas to be compared with the distribution pattern of reserves. Now, obviously, if the variations in reserves can only be three and a half to one, any allocation formula that would allow a variation greatly in excess of that ratio would not be a proper allocation formula.

Q Why?

A Because it would be impossible for that formula to assign allowable in relation to the reserves under the wells.

Q Stated another way, it would permit one well to produce more of its reserves than another?

A More than its share.

Q More than its share of the reserve.

A Now, the opposite of that is not necessarily true. Just because the ratio of variation among or as between allowables is the same as the variation as between reserves does not state that that is a good allocation formula.

Q That depends on what you mean by good?

A Yes, sir.

Q What do you mean by good?

A I wish I hadn't used the word, good.

Q I just want to get it in the record. I understand it.

A An ideal allocation formula is one,as we said, would permit each well in the field to produce its share of the reserves. A good allocation formula, I think would be one that would minimize any preventable drainage as between property. Now, I say that, because I don't think there is any allocation formula that we would arrive at that would actually assign allowables to wells in respect to the reserves under each of those wells. But if we--

Q (Interrupting) Right there, there are some that would more nearly do it than others, are there not?

A There are some that have the possibility of doing it while others don't even have the possibility of assigning those reserves.

Q Yes.

A Now, if we agree that we just actually can't accomplish the ideal situation then, the next best thing is to get as close to it as possible. If you prevent or minimize any preventable drainage then, at least the gas will stay under the acreage assigned to the individual wells and will be available to be produced at sometime. It may not be produced at the time and in the proportion on a current basis, that the reserves under that tract are related to total reserves in the field.

Q That would be due to factors other than the operation of the formula, wouldn't it?

A Yes, sir.

Q Such as the market outlet, the well had andthings of that sort?

A Well, part of it could be layed on the formula if you didn't, unless you had an accurate formula.

Q I am assuming that you have an accurate formula.

A Well, I don't have an accurate formula though.

Q I know it isn't accurate. I mean it is as near as you can get under all the facts and circumstances?

A With the factors that I considered in the allocation formula?

Q Yes. So, what you have attempted to do here is to find a formula that would permit the wells to be allocated an allowable somewhat in relationship to reserves?

A Yes, sir.

Q And after considering this matter, what type of formula would you represent to the Commission that the Commission should adopt in prorating gas in the San Juan Basin?

A I would recommend the adoption of the allocation formula 75 percent to acreage and 25 percent to acreage times deliverability.

Q In your opinion, is that the allocation formula of all of those that you have considered that will most nearly, in your opinion, allocate the gas to the wells in relationship to the well reserves?

A Yes, sir, out of the five formulas considered, I think that formula will come nearest to allocating the allowable in relation to reserves.

Q Are there any other formulas that you could have considered that you didn't consider that would more nearly do it than the one you recommended?

A I don't know.

Q That you know of?

A Well, I didn't consider any other formulas in the study and there might be another type of a formula or another combination of formulas that would do a better job.

Q But if there is, you don't know about it?

A Well, I just am not able to judge them because I didn't make any study with respect to any other formulas.

Q You did study these and you have determined that the one you recommended would most nearly allocate the allowables to the well, somewhat in relationship to the reserves beneath the land?

A Well, it has the possibility of doing that.

Q Yes? A Yes, sir.

Q Now, I have one or two more questions here that I want to ask you. You have detailed to us here the factors,which you say, must be considered in weighting that deliverability, is that not true?

A Yes, sir.

Q It is also in this record that the factor of deliverability is not related to reserves, that is true, is it not?

A Yes, sir.

Q Now, I want you to explain to this Commission, if your effort is to find a formula that will most nearly as possible, allocate gas to wells in relation to their reserves, you have selected a factor in your formula to accomplish that purpose, that is not related to reserves?

A I tried to explain that to you last night and I never did get it done.

Q You mean I didn't understand it or you didn't explain it?

A I think you didn't have me under oath. When we started out to arrive at an allocation formula, the purpose was to, as nearly as possible, allocate or arrive at a formula that would distribute the allowable in relation to reserves. Now, the factors that effect reserves, at least the relative factors that we have to be concerned

with were area, pressure, thickness and porosity.

Q The term, area, you use there, you mean acreage?

A Yes, sir. By pressure, I mean stabilized reservoir pressure and by thickness, I mean effective thickness and by porosity I mean that, porosity.

Q Yes, sir.

A Now, unless we assume in the beginning that all the reserves be exactly equal under each tract, we have to consider something besides acreage.

Q Well, now, we know that doesn't exist, do we not?

A Yes, sir.

Q All right. So, you have to eliminate the factor of acreage?

A We have to use something other than acreage in our allocation.

Q Along with it?

A Along with it, yes, sir. We are not going to eliminate it. We come to the terms of pressure, thickness and porosity. Pressure of a sort can be obtained so that you can have an acreage and a pressure formula but that assumes that the thickness and the porosity are constant under each one of the tracts and that the only variation in reserve is pressure, obviously that is not the case.

Q We know that, do we not?

A Yes, sir. So, we come to the terms of thickness and porosity. The only factor that we have in respect to these wells that is in any way affected by thickness is the deliverability. If we say we are going to put acreage and pressure and deliverability in the formula, we still haven't taken care of porosity and I don't think that we really can take care of it. Now, if deliverability is affected

by pressure to some extent or to a rather marked extent, in fact, so, that the deliverability term could be taken as a variation in deliverability could be taken as representing a variation in pressure and thickness. On that basis, I think you can justify the use of the two terms, acreage and the acreage times deliverability and attempt to weight those terms in such a manner that they have the possibility of matching or of assigning allowables in relation to reserves.

Q You could do the same thing with pressure, could you not?

A Yes, sir, except you would immediately say that there was no variation in thickness or porosity in the field.

Q Yes, but pressure is a function of reserves?

A Yes, sir, or reserves are a function of pressure.

Q And you could have used the term, pressure, in arriving at an allocation formula to be applied in this field, could you not?

A Yes, sir.

Q What objections did you find to the use of pressure?

A The only objections that I had to pressure was that it was not a stabilized pressure. In many cases, wells of high deliverability pressure will retain to a stabilized pressure in a much shorter time than wells of low deliverability capacity. Now, the deliverability is dependent on the pressure. So, if the pressure is no good, the deliverability is no good.

Q I believe it is in this record that, if I am in error in this statement, I can be corrected. I believe it is in the record that it would take 180 days to stabilize some of those wells?

A I believe that was stated, yes.

Q Of course, --

A (Interrupting) You are talking about degree of stabilization?

Q Yes, the present pressures in the field, I believe are taken under time limit of seven days, is that right?

A Yes, sir.

Q And it is in this record that pressures in this field just won't stabilize over that period of time?

A Yes, sir.

Q And if it ain't in the record, what is your judgment about it?

A Well, from some of the pressure build-up data that I have seen, it definitely indicates that there is a long time stabilization period required to arrive at a stabilized pressure.

Q To stabilize these pressures, you have to shut in the wells, do you?

A Yes, sir.

Q Returning to your pressures and the comparisons of pressures and your comparison of deliverabilities, you are saying that if you can't get good pressures, why then, you can't get good deliverabilities?

A The deliverabilities can't be any better than the pressures.

Q So, you are faced with the situation, are you not, of just, well, if I can put it in the vernacular more or less of just spitting at a crack to determine whether you are going to take pressures or deliverability. Isn't that what you are getting down to?

A There is only three times you have acreage pressure and deliverability that you know about these wells. If you want to assume that reserves under each tract is exactly the same, then you don't need to consider anything but acreage. If you assume there is a variation then, you have to take into account something else and the

only thing left is pressure and deliverability.

Q You have chosen deliverability over pressure, why?

A Well, I would just have to be trying to justify what I did, to say why. Pressure could have been concerned. If I had considered pressure, I would try to arrive at the proper distribution between an acreage times pressure formula and an acreage times deliverability formula. Now, I didn't make that study and I don't know what the proper weight would be between acreage times pressure and acreage times deliverability. All I can say is that I didn't consider pressure, I considered only acreage and deliverability.

Q I am not asking to state what your results would have been or how you would have weighted pressure as compared to deliverability. All I am saying is that you just took the choice of deliverability rather than pressure?

A Yes, sir.

MR. FOSTER: I believe that is all.

GOVERNOR MECHEM: Any cross examination?

MR. GRENIER: I have a few questions.

By: MR. GRENIER:

Q Mr. Cullender, I believe that you and Mr. Barry testified that the factors to be taken into account in figuring reserves are acres, porosities, pressures, connate water content, and thickness of sand, is that correct?

A Yes, essentially, yes.

Q And that deliverabilities, on the other hand are affected by pressure thickness, sand and permeability, is that correct?

A Yes, sir.

Q That would mean then that the factors of acres, porosity,

connate water content would have an effect upon reserves but not an effect on deliverability, am I correct in that?

A Did you say acreage porosity and connate water?

Q Yes, sir, they would be affecting only the reserve side of the picture as opposed to the deliverability side?

A That is correct except, well I think that is correct, yes.

Q And that the permeability factor would affect only the deliverability side as opposed to the reserve side?

A That is right.

Q And the pressure and thickness components would affect both, that is to say, would have an effect both on reserves and deliverability?

A Yes, sir.

Q Now, then in effect, what you are doing then, in computing reserves based in a formula containing in part at least a deliverability component, you must be assuming that the water, I mean that the water and porosity factors are fairly constant throughout the field, is that correct?

A Well, that would be an assumption, if you were wholly justified in using deliverability in your allocation formula. As I tried to explain awhile ago, the deliverability, some other term just has to be in the allocation formula.

Q Well, in the formula which you have suggested, acreage is a factor, so apparently you were weighting it by acreage. You were given some, there is nothing in there to reflect porosity and connate water content. So, apparently they have just been dropped out as not being of material significance in the case of this particular field?

A No, they have been dropped out because as far as I know there

is no way that I can evaluate them and take them into account.

Q The data is not available and therefore has not been put into the formula?

A As from well to well, that is correct.

Q Thank you. The same thing then would be true of permeability. We do not have detailed data from well to well which is why you left that out, is that correct?

A Permeability, as far as I know, doesn't have any effect on reserves.

Q That is right, we understand that and it effects only the deliverability?

A I didn't intend to consider permeability, as one of the factors that needed to be considered in arriving at an equitable formula.

Q All right. That, then is why you have come down to a formula which in effect, considers the three factors of acreage, pressure and thickness is the net effect of what you have done?

A Well, it considers only the factors of acreage and deliverability and deliverability is affected to some extent by pressure and thickness.

MR. GRENIER: That is all.

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

Q Referring to your Exhibit 6, Mr. Cullender, which is a tabulation of the studies which you made?

A Yes, sir.

Q I will ask you as to the method you used in computing the volumes of gas that wells with low deliverability would produce during the month?

A I assigned, I did not assign any well allowable in excess of its deliverability.

Q Well, in other words, on these low deliverability wells you took the deliverability and multiplied that deliverability by 30 and said that was the amount of gas that well would produce during the month?

A No, sir. The figures are on a daily basis. I just used the actual deliverability, assumed that it would--

Q (Interrupting) And your figures--

A (Continuing)--assumed--

Q (Interrupting) Excuse me, and you have taken, all these figures that you have computed here are based on the assumption that each day that we will be able to deliver its deliverability?

A Yes, sir.

Q Now, then, whenever these low deliverability wells are unable to deliver the deliverability that you have assigned them, there is a quantity of gas that has to be made up by wells with higher deliverability or the market wouldn't be served, isn't there?

A Yes, sir.

Q So, that the effect of giving acreage more consideration means that you bring more and more wells into the category of limited wells which can't produce in excess of the figures you have assigned them here?

A Yes, sir, the more weight to acreage, the larger number of limited wells that you have.

Q And there is the larger volume of gas that must be reassigned to wells with higher deliverability whenever one of these limited wells is shut in or for any reason can't make its allowable on that

day? A Yes, sir.

Q Now, then when you get to your factor of 75 percent acreage you then come up with 312 wells that have a deliverability of less than the allowable which is given to the field?

A That is less than the allowable would be, that would be assigned by the factors.

Q So, that more than 50 percent of the wells that you are considering in that column must produce their deliverability every day in order for these figures that you have here to be valid?

A No, sir.

Q Well, suppose that 50 of these 312 wells are off the line for ten days? A All right.

Q You have assigned the limit of their deliverability to those wells? A Yes, sir.

Q Where is the gas that those 50 wells are scheduled to produce going to come from?

A It is going to come from other wells that are capable of producing that gas.

Q That doesn't show in the computation that you have made here, does it?

A No, sir, but that does not make these figures invalid.

Q Well, to the extent that you haven't allowed or made any computation for the inability of 312 wells to produce every day this computation isn't accurate, is it?

A Well, you, I believe, are talking about the mechanics of day to day allocation. You are talking about 54 and a half percent of the wells are not going to be able to deliver all of their assigned allowable. Now, that 54 and a half percent of the wells has 30 per-

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cent of the total allowable in the field. If you assume that 15 or 20 percent of that 30 percent is loss, you have six percent of your total allocation that has been lost to these limited wells. There, as far as I know, no allocation formula in effect anywhere that doesn't allow over and under production provisions by which the 69.84 percent of the market could be increased by the six percent from the 260 high capacity wells. There would be very little variation, I think, in the final answer even after the reallocation of the gas that you are talking about being lost.

Q Well, now, in practical operation, if you use the 75 percent acreage formula, you have got 54 percent of your wells that you would normally expect under production on?

A Yes, sir, which represents 30 percent of the total allocation.

Q So, to the extent that that under production from these wells has got to be assigned to the wells that have high deliverability, the very nature of production is going to force an allocation of more allowables to the high deliverability wells that you have shown here, wouldn't it?

A To a limited degree, yes, sir.

MR. HOWELL: That is all.

MR. SPURRIER: Anyone else?

MR. SMITH: Representing Stanolind.

MR. SPURRIER: Let's take a short recess.

(RECESS)

MR. SPURRIER: Mr. Foster.

MR. FOSTER: I would like to offer Exhibits 2, 3, 4, 5, and 6, 7, and 8.

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

A On Exhibit 8, I made a misstatement. Mr. Foster asked me if I said it right and I said yes, but I didn't. Where Curve E deviates from Curve D is at 54.55 percent of the well and I said before it was 64.55 percent of the wells.

By: MR. SMITH:

Q I believe you referred to your Exhibit 8, that approximately 40 percent of the wells,you have, the lines B, C, D and E coinciding so that with respect to all the formulae except the one that is 100 percent deliverability, 40 percent of the wells in the field would not be affected by the adoption of either or any of the three other formulas?

A That is not quite correct. At 31.64 percent of the wells will not be affected to any greater extent by the 25 percent, by the 50 percent acreage formula than they would by the 25 percent acreage formula. The next point is at 46.68 and beyond that point the 50 percent or the 75 percent acreage formula would not affect the well below that point any more than would the 50 percent formula. Up at 54 and a half percent, the 100 percent acreage formula will not affect any more wells and by affect, I mean will not change the allowable of these smaller wells any more than the 75 percent of the acreage formula.

Q Now, Mr. Cullender, referring to Phillips' Exhibit 3, I will ask you to look at it and at the 4,000,000 deliverability group, where is the breaking point on that?

A There was one well had deliverability between 3,600,369. The next well in that order was somewhere between 5,400,000 and

5,499,000, so, the breaking point would come there at between the 3600 and the 5400 group.

Q You consider that the 342 wells that you had deliverability tests on are representatives of the wells in the field?

A That is the only assumption, I think that I could make that they were fairly representative, that probably the distribution wouldn't be changed too much more by the additional wells.

Q Referring again to the breaking point, which is indicated by the pencil mark on Exhibit 3. How many wells are listed there as having a deliverability higher than 4,000,000?

A Ten, I believe.

Q Ten. What percent of the total of 342, is that?

A It is about three percent.

Q So, that you find 97 percent of the wells in a catagory of having deliverability less than 4,000,000 per day?

A With respect to the actual test that was right. Now, I think including the deliverability tests the estimated deliverability test, I should be able to find what percent of the wells were above 4,000,000 as actually used in the study.

Q I am asking you with respect to this particular Exhibit up here.

A Yes, sir, that is right.

Q Let's refer to Phillip's Exhibit No. 7.

A Yes.

Q We find that on your recommended formula which is 75 percent acreage and 25 percent deliverability that the point 59 which all wells receive an allowable. In other words, the excess production is to be allocated to other wells is at what point?

A 557,000.

MR. FOSTER: No, no.

MR. GRENIER: 733.

A Oh, at the 75-25 formula, it is 733,000.

Q 733,000 cubic feet per day?

A Yes, sir.

Q At 4,000,000, how much of an allowable do you have on that formula?

A You mean what is the allowable of a well with 4,000,000?

Q What do you get with the 4,000,000 deliverability?

A You would get 1,120,000 cubic feet of gas per day.

Q I wonder if you could calculate for me the ratio of the additional allowable to be received by the 4,000,000 well over the ratio using the bottom point, the breaking point where it leaves the curve there?

A It would be 1120 divided by 733. Can I accept his figures or do you have a figure?

Q If you want to look at them.

A 112.

Q That is right. 112, is the ratio 1.55 to 1?

A You mean is 733 divided into 1120 1.55 to 1?

Q Is the ratio of 1.55 to 1, the ratio of increased allowables?

A I believe that is right.

Q I believe you adopted Mr. Barry's testimony.

MR. FOSTER: We didn't adopt it. The record speaks for itself. If you want to testify that he adopted it but I object to your doing it.

MR. SMITH: Well, let the record speak for itself.

MR. FOSTER: I believe that is fair.

Q You did use Mr. Barry's studies as your basic assumption for your calculations, didn't you?

A Yes, sir, not for the calculations with respect to the allowables under the different formulas but in comparing the allowables into the different formulas, I compared them to his reserves.

Q Do you consider that his estimate of disparity and reserves could be on the order of three and a half to one to be correct?

A Yes.

Q Then, your formula that you are recommending only gives weight, one and a half to one whereas by your own witness's testimony there is a disparity of three and a half to one in so far as the assignment of allowables to 97 percent of the wells in the field is concerned?

A In so far as the ratio of allowables of 4,000,000 at the point of 4,000,000, the ratio is 1.55 to 1.

Q I will ask you, if you can make the similar calculation for the formula 50 percent acreage and 25 percent acreage and 75 percent deliverability and see how those ratios work out?

A Well, I read this allowable at 4,000,000 from, at 1,430,000 cubic feet of gas a day. I come out with the figure of 196, does that check with you?

Q I believe our figure is a little higher. 2231, it is 199.

A I got 196.

Q 196 to 1?

A I divided by the 733 again. I will divide by the 557 which is, I presume the figure you wanted me to divide by and I get 257.

Q In other words, roughly on the order of two and a half to one?

A That is right.

Q With respect to the 75 percent deliverability and 25 percent acreage, can you calculate that for me?

A I read that to be 1820 which would be divided by 315, that comes out to be 578.

Q 578 to 1? A Yes, sir.

Q In view of the testimony of Mr. Barry, did the reserves on the order of three and a half to one just based on sand thickness alone and without giving consideration to variances in connate water and porosity, do you not consider that the assignment to 97 percent of the wells in the field of an additional allowable on the order of 1 and a half to 1 does not do equity to the people who have the higher deliverability wells?

A No, sir. I believe that that is it because there are larger wells in thefield than the 3,000,000 feet, those are only three percent of them.

Q Wouldn't the ratio remain more constant even if you estrapolated your curve?

A I beg your pardon. Do you mean if we go on out here?

Q That is right.

A No, sir.

Q But with respect to 97 percent of the wells in the field, however, the statement would still hold true?

A Well--

MR. FOSTER: (Interrupting) Let him answer the question.

MR. SMITH: I hadn't answered it.

MR. FOSTER: You said, wouldn't it hold true? You asked him the question.

MR. SMITH: Shall I start over?

Q With respect to 97 percent of the wells in the field, we have these various differentials that we have just been discussing. Now, referring to Phillips's Exhibit 8, I will ask you to locate on this chart the point at which 97 percent of the wells falls on line D?

A That falls at, that shows that three percent of the wells received 8 percent of the allowable.

Q So, that the amount of allowable assigned to the wells in excess of 4,000,000, would only amount to 8 percent of the total allowable nominated or permitted by the Commission, is that correct?

A Yes, sir. That three percent of the wells would get 8 percent of the total allowable under 75.25.

Q I believe you testified yesterday that you are familiar with the proration formula in the Hugoton field of both Kansas, Texas and Oklahoma?

A Yes, sir.

Q What is the proration formula in each of the three states?

A In each of the three states. The allocation formula in Guymon Hugoton Field in Oklahoma is 100 percent acreage times deliverability. With the deliverability being defined under the pressure conditions equal to 80 percent of the average pressure of Oklahoma and Kansas Hugoton Field.

Q Is that the same formula adopted in all three states?

A No, sir. Kansas Hugoton and Oklahoma Hugoton are the same deviation. They run the test in a different manner in that they take the shut-in pressure after the test in Oklahoma and before, the test in Kansas afterwards and in Oklahoma before.

Q What about Texas?

A Texas Hugoton Field is on 100 percent acreage times deliverability with the deliverability being defined at 80 percent of the individual wells shut-in pressure by the application of a correlation slope depending upon the rate of flow and the pressure pull off.

Q So, in all three states, one of the basis propositions is deliverability times acreage as the concept on which they prorate gas?

A That is right.

Q Now, in calculating your formula or in devising your formula, there is only one variable as I understand it, that is the deliverability?

A That is right. There is small variation in acreage, there will be as between wells but I think it is insignificant in arriving at the total.

Q For all practical purposes, the only variable factor that you suggest is deliverability?

A Yes, sir.

Q Would you say that using that calculation means that deliverability has some relationship to the reserve?

A I think that I explained why I used deliverability before, I don't believe that deliverability is related to reserves.

Q It is your opinion that the proration formula should be based on reserves?

A Yes, sir.

Q Then, as I understand it, you are recommending arbitrary action to the Commission?

A Mr. Foster accused me of the same thing earlier today. I

29 tried to explain at that time why I used deliverability and there is nothing I can do about it, that is the reason.

Q One other question. Mr. Barry testified yesterday that he selected core samples from 8 wells, I believe?

A Yes, sir.

Q Do you think that sampling of 8 wells with reference to 704, would afford an adequate sample for accuracy?

A I think Mr. Barry did the best job he could do under the circumstances.

Q Do you still think you could rely completely and accurately on such a small sample?

A In the absence of anything else, I don't know what you could rely on.

Q That was the best he could do under the circumstances?

A Yes.

MR. SPURRIER: Anyone else? Mr. Reeves.

By: MR. REEVES:

Q In the interest of saving time, I am going to try to confine this to questions on the basic underlying factors in determining the formula. I believe you testified that the formula is one that should allocate in proportion to the reserves under the well?

A Yes, sir.

Q I believe you also testified that you were dependent upon the estimate of reserves based on only sand thickness, three to 1, later corrected three and a half to one?

A I testified that in evaluating the different formulas that I relied on that, I relied on Mr. Barry's estimate of the variations in reserves.

Q I believe it is also clear that the estimate of reserves was based on a blanket sand with a ten percent porosity through the entire field?

A I believe that was the testimony, yes, sir.

Q As a matter of your opinion, do you consider it likely that in that whole area inside that dark line that porosities are uniformly ten percent?

MR. FOSTER: If the Commission please, the witness didn't qualify as a reserve engineer. He took the figures that were supplied by the reserve engineer and made his computation on that basis. I don't believe that is quite in order to interrogate him on that matter. If he wants to interrogate Mr. Barry, we will return him to the stand. I think it will save time and get the job done a lot better.

MR. REEVES: Well, I will rephrase my question.

Q Your basis was based upon an assumption that had uniform ten percent porosity throughout the entire pool area?

MR. FOSTER: Based on Mr. Barry's testimony, what ever that was. That is what he said. I don't recall what the record was on that.

A The study that I made was based on the deliverability test of the wells in effect of the allocation formula in evaluating the formulas relied on the information that Mr. Barry testified to.

Q Well, I believe in the testimony--

A (Interrupting) Sir--

Q (Interrupting) I believe in the testimony yesterday the record will speak for itself but there was a blanket sand with ten percent porosity and 30 percent connate water?

A I believe that is right but--

Q (Interrupting) If you take porosity into account and there has been testimony introduced to show it varies, connate water varies the testimony indicates 435 to 1; on porosity, four and a half to one which Mr. Barry didn't agree with his testimony, two to one on connate and 1.18 would come to 46. It is quite obvious that there is some variation. Let's cut it in half, if those factors which it has been admitted, determined reserves then a formula based on three and a half to one isn't accurate, is it? It doesn't result in a basic formula?

A Are you asking me to assume that the variation is on the order of 20 to 1, when I answer that question, or do you want me to say that I think it is 20 to 1?

Q No, I wouldn't expect you to say you thought it was 20 to 1. If it was 20 to 1, your formula would not be applicable and would not give equitable results?

MR. FOSTER: We admit that.

A I wasn't going to admit that.

MR. REEVES: Who am I questioning, you or the witness?

MR. FOSTER: It is obvious here that if the ratio of our reserves is too far out of line, then our formula is wrong. There isn't any argument about that.

A Well, I--

MR. FOSTER: (Interrupting) It is too far out of line. 20 or 30 or 40 or 50 based on three and a half to one obviously there is something wrong with the formula.

MR. SPURRIER: Let's see what the witness has to say.

A The only time that you know an allocation formula that

obviously will not work is when the possible variation in the assignment of allowable under that formula is in excess of the possible variation in reserves. Now, the very fact that you get the same answer, you get the same variation in both of them doesn't make a good formula. Now, then the fact that the variation that can be assigned by allowable is less than the variation that could exist in reserves does not make that within itself a bad allocation formula. It would certainly make you investigate some other formulas but it doesn't make it a bad formula.

Q But if we are wrong on the reserves under the leases, why I don't believe that you would recommend the formula that you recommended, would you?

A If Mr. Barry had come up with the figure of ten to one, I probably would have given a little more weight to deliverability.

Q That is the point I wanted to make.

A That is the point you want?

Q I don't want to take up too much time. I would like to make this point. In other words, this formula, there is 312 wells that to all intents and purposes are exempted from proration?

A Under the 75 - 25 formula there are 312 wells that have limited allowables, by that their allowable is limited to their deliverability. I wouldn't say they were exempt from proration. They don't have the physical capacity to get their share of gas.

Q Well, dry hole doesn't have its share--

A (Interrupting) It will not be in the allocation formula either.

Q In other words, there are 312 wells that are not going to be curtailed below their deliverability to all intents and purposes, no prorationing?

A I don't call that no prorationing, I call it allowable, that is limited to the physical ability of the well to produce below that wells share of the gas.

Q Those wells are not prohibited from selling to the market all of the gas they can produce?

A That is right, yes, sir.

Q 260 wells, only 45 percent are the ones that are taking the entire curtailment under what they can deliver, aren't they?

A Yes, sir, that 45 percent of the wells would take, would be unlimited as to deliverability which represents 70 percent of the total production but if a cut back came and the allowable was decreased then, some of these 312 wells would drop down into your limited category and the limiting deliverability would be smaller.

Q Well, I have one other point here that I think is rather important. Your figures are based on deliverability of 562,000,000 against a market of 320,000,000, I believe?

A Yes,sir, I think that is right.

Q I, also, believe it is testified there are now 704 wells or 23 percent more than your figures were based on?

A That is right.

Q The market still remains the same, does it not?

A I presume that it will for awhile.

Q Let's assume those wells were the same average as the others you have 692,000 cubic feet of deliverability?

A Yes, sir, roughly.

Q The market is 57 percent of your 592 or 46 percent of the deliverability of 692,000,000, isn't that correct?

A Well, I don't know whether it is correct or not. It seems

in the proper order.

Q The point that I am leading up to is this question, with that decrease in the market as compared to deliverability, wouldn't that tend to throw a considerable number of wells, higher percentage of wells into those that to all intents and purposes are not prorated under your formula?

A No, sir.

Q Well, there seems to be a difference of opinion there?

A Yes, sir, if I understood--

Q It is a matter of mathematics. We haven't time, unless you care to.

MR. SPURRIER: I would like to.

A As I understood the question, you said that would not the addition of these additional wells add to the market and increase the proportion of the wells in the limited category?

Q That is right.

A I said no. Now, then, what will happen is that this straight line that you see on Exhibit 7, 75 percent acreage and 25 percent acreage times deliverability will slide down to this point, to some point lower than it is which will then make the limited wells, say for instance be 557, now, if the limit were 4 and 733 and it is now 557 and we assume that the new wells are going to have the same percentage of distribution as the old wells, it would be a smaller percent of wells in the limited category.

Q Let's see, you divide up 25 percent of the gas on the total number of wells, don't you?

A Yes, sir.

Q Then, you take 75 percent of whatever is left of 25 percent

deliverability, don't you?

A Yes, sir.

Q I think you will find that the tendency is contrary, however, I could be mistaken, Mr. Cullender.

A If you assume that the new wells, let's look at it this way, let's assume that we decrease the market on the present wells I have in my study to about 275,000.--

Q Yes

A We will say.

Q Yes.

A That will then slide this curve down, which throws some limited wells over into the non-limited category. Now, if this market increases, it will go up.

Q In other words, if the market goes up, you throw more and more wells into the non-prorated situation?

A That is right.

MR. FOSTER: No.

A Non-prorated, all right then. They are in a limited category.

Q The limited wells then?

A Yes.

Q Those in which proration causes them no distress?

A No, because they have their ability to deliver their share of the gas, that is right.

Q I think in the interest of time I have established the primary things. I have several others here. Thank you, Mr. Cullender.

MR. SPURRIER: Anyone else?

MR. SELINGER: Selinger for Skelly.

By: MR. SELINGER:

Q I would like to ask the witness a few questions. Mr. Cullender, you said I believe/on direct examination that you have studied only these five plans of formulas, is that correct?

A Yes, sir.

Q And that you had not considered any other formula?

A I made no study on any other formula.

Q Did you consider any other formula with out studying it?

A Well, I kind of thought about all the formulas that I ever heard about, but I didn't seriously consider it.

Q You limited your study from the data you have to these five plans?

A Yes.

Q I believe when you made your remarks about an allocation formula of acreage times pressure, you had one objection to the pressure part of the formula and that you followed that up by saying the same objection to the pressure part, was also the same objection to the deliverability part of the formula, is that correct?

A Yes, sir.

Q By that you mean that in order to get your deliverability you must get your pressures?

A Yes.

Q You also said in commenting on the/allocation formula of acreage times pressure that such a formula assumed that the porosity and thicknesses were equal, is that correct?

A Well, they don't take into account any variation in thickness or porosity.

Q Which is another way of saying that it is based on the assumption of the porosity and thicknesses being equal throughout the

field, isn't that the same thing?

A Well, not quite, I don't think but--

Q But, at any rate, it doesn't consider those two factors. Let me ask you this, Mr. Cullender, doesn't your pressure decline with production reflect your porosity and thickness?

A It reflects the rate of decline of the reserves, which are in turn affected by porosity.

Q Would your answer then be to say yes or maybe or no?

A No, they don't represent the porosity and thickness, they represent the decline in pressure, represents the decline in reserves.

Q Which, in turn, is a reflection of porosity and thickness?

A Porosity and thickness are two factors that enter into the reserves.

Q I gather then, that the decline in pressure indirectly reflects your porosity and thickness then by the connection with the decline in reserves?

A Through that kind of a connection, I would go along with that.

Q Under your allocation formula of 75 - 25, will you tell the Commission what is the spread of allowable between the lowest proratable well and the highest proratable well?

MR. FOSTER: Using the 320 market demand?

MR. SELINGER: He can use under his plan. He assumed 320, I assumed that is what he is going to base his answer on. Let him make his explanation as to what market demand he used?

A I think probably we are going to have to look at Exhibit 6 to go along with this.

Q Doesn't that Exhibit just give averages? You explained to Judge Foster and the Commission that you took the lowest deliverability

starting with Well No. 1, clear on down to 572, so you necessarily must have indicated the deliverability, the initial potentials and the allowables of all the wells?

A That is correct. I just wanted to get oriented here on Exhibit 6. I mean, give you your answer.

Q Yes.

A But if you take the limited well under the 100 percent allocation to acreage that is the only deliverability that is prorated under all of the formulas that were considered. Now, I have the ratios worked out with respect to that 864 and a well with a deliverability of 15,909,000 and that is the figures that I have here.

Q All right. Your deliverability did go up to 17,000,000 but you are going to use your 15.9?

A Yes, sir.

Q All right, go ahead.

A On the basis of 100 percent acreage ratio is 1 to one. Ratio of 75 percent acreage 25 percent deliverability, the ratio is 3.4 to 1. Ratio of 50 percent acreage to 50 percent deliverability, the ratio was 7.0 to 1. Under the 25 percent acreage, 75 acreage times deliverability the ratio was 12.4 to 1. Under the 100 percent acreage times deliverability, the ratio was 18.4 to 1.

Q Would you garner out of that varied answer the particular answer that I wish with respect to what is the spread of the proratable minimum and proratable maximum under your recommended plan?

A I will have to do some figuring. The minimum is 733. I calculate the allowable under 75 percent acreage times 25 for a well having deliverability of 15,909,000 cubic feet of gas a day

which we referred to the 733 is on the ratio of 3.22 to 1.

Q Your ratio then of the proratable wells is in the neighborhood of 3.22, is that correct?

A Yes, sir.

Q Now, I believe you stated that you were considering an allocation formula that you felt it should approach the reserves and also in the previous answer you gave that the allocation should also attempt to minimize drainage across property lines, is that right?

A Yes, sir.

Q When you say drainage in the reservoir, what do you mean, what causes that drainage?

A Some wells being produced at a faster rate and causing the pressure to decline around some wells more than around a surrounding well.

Q Am I correct in saying that the pressure gradient causes the drainage across property lines?

A Yes, sir.

Q Would it be correct to say that the more you minimize drainage the more ideally you approach the recoverable reserves of each operator's property?

A Yes, sir.

Q Then, an allocation formula should attempt to equalize pressures in the reservoir as nearly as practicable?

A It should attempt, it should attempt to prevent any large differences in pressures.

Q But it is, the objective of that pressure gradient is to become overcome as nearly as possible by attempts to equalize it as nearly as possible?

A I think so, yes, basically.

Q How does deliverability in itself prevent or minimize such drainage?

A I don't believe it does.

Q What factors in deliverability do minimize drainage?

A Well, there aren't any factors in deliverability that have any effect on pressure.

Q Will your decrease in deliverability result from the decreased pressure resulting from production?

A Deliverability will decline, yes, with the decline in pressure.

Q Therefore the only factor which prevents or minimizes drainage is the pressure decline or pressure equalization?

A Yes, sir.

MR. SELINGER: I believe that is all.

MR. SPURRIER: Anyone else?

MR. JONES: Trevor Rees-Jones representing Delhi.

By: MR. REES-JONES:

Q Mr. Cullender, the very first part of your testimony you referred to this isopachus map, I believe you pointed out some examples of wide variations within a section in deliverabilities, I believe you had a ratio of 4.5 or 6 to 1, is that right?

A I think so.

Q What was the reason for pointing those out?

A Mr. Foster asked me to point out some differences that were shown on the map and I got up here and I looked for some purple colors next to some red colors and I saw those two sections and I pointed them out.

Q Well, perhaps, I needn't go any further. I wonder, did that have any bearing on your going from there on into a proration formula?

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A Not those two particular wells.

Q But I mean the fact of variances, where did that fit into your testimony which led up to your proration formula?

A The fact that there is not appreciable variation in thickness and you have large variations in deliverability entered into the amount of weight that I put on acres times deliverability or that I considered to be appropriate to put on acres times deliverability?

Q Yes, sir. Directing your attention to Section 21 of Township 30, North, Range 9 West.

A 30 North?

Q Yes, Range 9, West, Section 21. We have a well on the west half there, is that correct, which shows a low deliverability?

A Yes, sir.

Q You have one in the east half which shows a high deliverability?

A Yes, sir.

Q Are you aware of the fact that the well in the west half being the Delhi Florence Federal Number 1 well is completed only in the Cliffhouse formation? A No, sir.

Q If that statement is true, wouldn't you normally expect that the deliverability of that well would be much lower than the well in the east half, if the east half well is completed in the entire Mesaverde?

A I assume that the well in the west half was completed to the best of the ability of the operator to complete it and that is his highest deliverability.

Q Are you aware of the fact there are a number of wells in Township 30 North, Range 9 West which is in the best area of the Mesaverde that are completed only in the Cliffhouse formation?

A I was not aware of that situation, no.

Q Would you like for me to read the five names and locations so that you can check them?

A If you want to.

Q Florence Federal 3-8 well located in south west quarter of Section 13.

A Yes, are we only in 30 and 9?

Q Yes, sir, only 30 and 9. South west quarter of section 14, Florence Federal 3-8 well. Is there a variance between that well and the one on some tract adjacent to it?

A Yes, sir.

Q The next well is Florence Federal 1-13 north east quarter of Section 18.

A North east quarter of 18, okay.

Q The next well is Florence Federal 1-6 south west quarter of 23.

A South west of 23?

Q Yes, sir. The next well is Florence Federal 2-10 in the north east quarter of Section 30?

A Okay.

Q If it is true, Mr. Cullender, that the wells I have given you along with the one in Section 21 are Cliffhouse completions only then, couldn't you assume that the deliverability would be greater had they gone straight though to Point Lookout?

A I assume not because if the operator had thought they would have been better wells, I see no reason for--

Q (Interrupting) You are relying strictly on what the operator did at the time that the well happened to be drilled?

A I am relying strictly on the variation in deliverability, as from well to well.

Q It is your testimony to compare a well completed on the Cliffhouse formation to one completed in the entire Mesaverde formation?

A If we are discussing deliverability as a criteria we have no alternative but to do that.

Q Mr. Barry and you like to average connate water and porosity but you don't like to average out of sand thickness, if one well is completed only in the Cliffhouse and the rest are completed in the entire Mesaverde, is that correct?

A I don't think that there is any relation between the first part of the question and the last. If you repeat, maybe I can.

Q Well, forget it. The only point--Mr. Cullender, do you know of your own information that generally these wells completed only in the Cliffhouse have about one fourth of the initial potential of wells in the same area completed in the entire Mesaverde?

A No, sir.

Q You do not know that? A No, sir.

MR. REES-JONES: Thank you, sir.

MR. SPURRIER: Anyone else have a question of Mr. Cullender?

MR. UTZ: Yes, I have a question or two.

By: MR. UTZ:

Q Mr. Cullender, in relation to what Mr. Jones was just asking you, do you believe that a well completed in Cliffhouse could also drain the point, Lookout?

A Let's see, the Cliffhouse is, it would be very minor if at all. It might through the fractures in the Menefee, might

get some of the gas, yes, sir. It would be more likely to go to an adjacent well completed in the Point, Lookout.

Q In other words, it is possible for the Cliffhouse completions to drain the whole Mesaverde section, is that right?

A Given time, yes.

Q And if you wanted to increase the deliverability, you can do so by recompleting, can't you?

A I assume that if there is a bunch of wells that are just drilled half way through the formation with the deliverability allocation lower than the offset wells drilled through the formation, somebody would be on to those pretty quick.

Q In other words, he has the opportunity to recover his reserves?

A Without knowing the conditions of the well, I would say that probably that he did. I don't have any idea as to the condition that the wells are in.

Q I believe that you stated,Mr. Cullender, that there were no, as far as you were concerned, there was no relationship between deliverability and reserves?

A Yes, sir.

Q Even if a well had ten times the deliverability, you would assume that it had no more reserves?

A Well, it would depend entirely on what the factor was that contributed to the increase in deliverability. If it was permeability that did it, there would be no increase in reserves, if it was thickness, that did it, there would possible be an indication that that well in fact, if thickness was the cause, it would certainly follow that the reserves were higher in the other well. But since

I don't know how much of that increased deliverability is due to permeability and how much is due to thickness, I hesitate to say that the deliverability, increases in deliverability indicates an increase in reserve.

Q Would it, the higher deliverability well could have more reserves?

A Could have.

Q It could also have less? A Yes.

Q If you can, Mr. Cullender, I would like to know what your recommendation for formula would be if the reserves ratio was, say, 1 to 5 instead of 1 to 3½?

A Based on the study I made, I think that I would give more weight to the deliverability, possibly in the neighborhood of two-thirds of the allocation to acreage and one-third of it to acres times deliverability.

Q By the same token now, had the ratio been 1 to 10, would you have an opinion on that?

A Yes, sir. I stated when Mr. Foster asked me what allocation formula that I would recommend, I stated that the fact that the variations in allowable, the possible variation in allowable exceeded the possible variation in reserves indicated a bad formula. But that the fact that the variation in allowable, the ratio of the variation in allowable was in line with the variation in reserves did not within itself, make that a good formula. It only indicated that it had the possibility of being a good formula. I think in any allocation formula you need some kind of a stabilizing influence that will remain fairly constant, year after year, because assuming that you can accomplish the purpose you set out to accomplish, you

produce the wells in exact proportion to their reserves. Then, each year, their reserves will be in the same proportion that they were initially and their allowable should be in the same proportion year after year. If you put too much weight on a factor subject to the error that deliverability is subject to well conditions, the effect of stabilized pressure, and so forth you are going to have a large variation in allowables as between wells from year to year as you conduct your annual tests. Therefore, when I started getting up very high on the weight of acreage times deliverability, I would start considering putting the brakes on.

Q If the formula that you recommended, 75 acreage to 25 acres times deliverability is equitable for a reserve ratio of 1 to 3½ but that it made the problem of the pipeline company, if you put an additional weight and made it impractical/ we will, say for the pipeline company to gather that gas under that type of formula, how much consideration or weight would you give to the pipeline problem?

A In recommending the formula to the Commission, I would give no weight to it, the weight would have to be put on the allocation formula by the Commission if they have a right to do. I wouldn't include it in my recommendation as to the proper formula to allocate the gas.

Q In other words, you, in other words, to make the pipeline get the reserves out of the field, you would leave that up to the Commission?

A Yes, sir.

MR. UTZ: I believe that is all I have.

MR. SPURRIER: Mr. Macey.

By: MR. MACEY:

Q Under your proposed formula assuming that you have a six months proration period, do you know of any reason why the pipeline couldn't gather the gas as it would be allocated under your formula?

A Not with proper controls in your rules with respect to over and under production and proper balancing rules to provide a total allowable at all times, equal to the market demand.

Q One other point on your, do you think that this Commission should consider economics in so far as economics pertain to the pay out of a well in allocating the gas in the Blanco-Mesaverde Pool?

A To the extent that such considerations constitute a waste prevention method due to the abandon of wells. I think they are well within their right.

Q Do you think economics, an economic factor should be considered?

A With respect to the prevention of waste to not causing the premature abandonment of gas wells to that extent, I think it is a proper matter.

Q Do you think there might possibly ought to be a minimum allowable instituted?

A I don't think it is necessary.

Q Your formula--

A Under the 75 - 25 formula.

Q Have you made any calculations as to what the rate of time of pay out would be on a well drilled on the average well drilled in the Blanco-Mesaverde Pool with an allowable of 2,500,000 per day?

A No, sir.

Q If that pay out were within approximately one year, do you think that is a reasonable pay out as far as the quickest pay out would be in the field?

A I think that we put a lot of our money into projection that don't pay out that fast.

MR. MACEY: I think that is all.

MR. UTZ: I have one more question if I might.

By: MR. UTZ:

Q From what I have heard so far, I think every one is agreed that we can't use straight acreage, which leadsto the proposition that we are going to have to use deliverability or pressure or something else. Between the two other factors that have been recommended so far which is pressure and deliverability, pressure or deliverability from the practical standpoint of taking the bottom hole pressure once a year to apply it to the acreage as compared to taking the deliverability test once a year, which is applied to the acreage, in your opinion, which do you think is the most reasonable test?

A Well, now, when you say bottom hole pressure, do you mean actually run a bomb or to take a well at pressure and calculate it?

Q I mean, doing whatever is necessary to get an accurate bottom hole pressure, whether it is a bomb or sonic method or other methods.

A Well, the length of time involved is in favor of the pressure I believe. You have to determine your pressure when you take your deliverability test. From a practical standpoint, if you had to chose from the simplest test to obtain, there would be no doubt, it would be pressure.

Q You think pressure would be simpler to take than deliverability?

A Yes, sir.

Q Do you see anything particularly wrong with the present deliverability test?

A Yes, sir.

Q Would you care to state that?

A The present deliverability test calculations is based on the static flowing pressure in the annulus while the flow is being taken through the tubing. If there is communication between the tubing and the pressure such a procedure, between the casing and the tubing, such a procedure is accurate in calculating the proper flowing pressure. If that pressure, if there is a bridge of any kind between the tubing and the casing, that pressure is not an indication of the draw down in the formation and the use of it would be highly in error.

Q The calculation of friction through the tubing as applied to all wells, is subject to considerable error at high flow rates?

A There is some question as to whether the taking of a pressure after the deliverability test is proper as compared to taking it before the deliverability test. I think that covers the objections to the test, as I see them.

Q Do you think that if it, we went to friction calculations on each well in the Basin that it would be an equitable test?

A I think if a suitable set of friction factors could be developed for the actual conditions existing in the Basin that you could probably get an equitable test through the use of friction factor. That is some work that would have to be done and without knowing whether you could accomplish that end or not, you couldn't say.

Q That is, in your opinion, the only objections to the test as it is now?

A I believe so, yes, sir.

MR. UTZ: That is all I have.

MR. SPURRIER: Anyone else have a question of Mr. Cullender?

MR. MACEY: I have one more.

By: MR. MACEY:

Q Mr. Cullender, in connection with that deliverability test, if after the test is run and the factor, P sub C is as determined, as the formula stands right now, if that factor P sub C is low from what it ought to be, in other words, the determination of that pressure is low, due to anyfactor either human or mechanical, does it not tend to give the well a higher computed deliverability?

A Yes, sir.

Q In other words, unless the well reaches a maximum P sub C the test is in favor of the operator, is that correct?

A Well, I know that to be correct within certain ranges. I think that probably under the deliverability formula by deliverability calculation which is based on a certain percent of the individual well shut-in pressure that such a situation would hold over the full range of the deliverability. I think that if you got your pressures too far off, probably you might, I hesitate to say that if you missed it 200 pounds or 400 or on down, it would hold all the way. If you miss it 25, 50 or 75 pounds, it will give you a calculated deliverability for the lower shut-in pressure.

MR. MACEY; That is all.

MR. SPURRIER: Anyone else? Mr. Foster.

MR. FOSTER: I have one on redirect.

MR. SPURRIER: Is there anyone else before Mr. Foster closes the record. Go ahead.

RE-DIRECT EXAMINATION

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By: MR. FOSTER:

Q Mr. Cullender, in your opinion, should the Commission adopt some allocation formula to the San Juan Basin for the prorating gas?

A Yes, sir.

Q What do you base that on?

A On two situations, the present production in the Basin is being taken approximately or very close to 100 percent acres times deliverability and I don't feel that is a proper relationship of production to reserves, that it should be more in the nature of 75 percent acreage and 25 percent acres times deliverability, therefore, I do not feel that correlative rights are being protected. Also, the capacity of the wells to produce appears to be in excess of the market demand inasmuch as the wells produced some 350,000,000 feet of gas in March a day and only produced around 260,000,000 feet of gas per day in April as reported by the New Mexico Engineer Committee at Hobbs, so that there was a cut back in April and I think when a cut back is required, the Commission should designate where that cut back should come.

MR. FOSTER: That is all.

MR. SPURRIER: We will recess until 1:15. El Paso will be on immediately after lunch, If no further questions of the witness.

MR. FOSTER: One other question.

By: MR. FOSTER:

Q What do you consider to be the efficient drain and economic drainage of gas in the San Juan Basin?

A At the present time?

MR. SPURRIER: In the Mesaverde?

MR. FOSTER: Yes, in the pool we are talking about here.

A At the present time, I have no, nothing to base a conclusion that that 320 acres is not an efficient drainage area. Future production may show that it is not or that it is. In my opinion, it is, 320 acres is a reasonable drainage area for a well in the San Juan Basin.

MR. FOSTER: That is all. Thank you.

MR. SPURRIER: Recess until 1:15.

(RECESS)

AFTERNOON SESSION

MR. SPURRIER: Mr. Howell.

MR. HOWELL: May we proceed?

MR. SPURRIER: Yes, sir.

MR. HOWELL: We would like to have Mr. Woodruff sworn.

F. N O R M A N W O O D R U F F

the witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By: MR. HOWELL:

Q Will you please state your name for the record?

A I am F. Norman Woodruff.

MR. HOWELL: Are Mr. Woodruff's professional qualifications as an engineer acceptable to the Commission? I believe he has testified before?

MR. SPURRIER: They are and he has.

Q Will you please state the experience which you have had in connection with gas proration?

A Yes, sir. Prior to my employment with El Paso Natural Gas Company, I was employed by the Railroad Commission of Texas for a three

year period. The major portion of that period was spent in the capacity of supervisor of the gas department. Under my supervision came the holding of hearings on gas pools, the evaluation of data, the preparation of rules for recommendations to the Commission, the administration of such rules after promulgating them, the preparation of proration and allocation formulas and the proration schedules.

Q How long have you been employed by El Paso Natural Gas Company?

A Three and a half years.

Q During that period of time, what work or study have you done in connection with the San Juan Basin and the question of gas prorationing?

A Since I went to work for El Paso Natural Gas Company, a portion of my duties has been to make studies of the San Juan Basin, since it is one of our major sources of supply supplying our markets. I aid in the preparation of reserve studies and under my supervision come the determination of the deliverability estimates and availability estimates during future years of the pools in the San Juan Basin.

Q Have you prepared a map of the Basin and put on that map, all of the wells completed in Mesaverde that you had any information on?

A Such a map has been prepared under my supervision with my aid, yes, sir.

Q Is that map the one that is on the wall which is marked El Paso Natural Gas Company's Exhibit No. 1-A?

A It is.

Q How many wells are shown on that map?

A 701 wells.

Q Does that represent all of the completed wells that have been

tested that you had information on up to a certain date?

A Yes, sir, as of June 7th, this year.

Q As of June 7, 1954?

A Yes, sir.

Q I note that Exhibit 1-A has some various color bands and is called, I believe an isopotential map. The colors are placed on there with reference to what factor concerning the wells?

A The potential of the well.

Q The initial potential?

A The initial potential of the well.

Q Why, in these studies, have you used the initial potential of the wells?

A I have used the initial potentials because we do have that value available on every well.

Q Is the deliverability available for all of the wells which have been completed?

A No, sir, it is not.

Q And will not be available for some wells until there is a pipeline connection, is that correct?

A That is correct.

Q Now--

A (Interrupting) I might add one other reason for using initial potentials. I am going to compare this map here with another Exhibit which is a factor entering into reserve calculations and I wanted both maps to be on the same age basis and initial potentials are as of a common age initial condition.

Q That is the initial potential represents the capacity of that well to produce under the same conditions at the same time with

relation to the age of each well?

A That is correct.

Q And if you were to take deliverability some wells have been delivering three years and others have not made any delivery?

A That is correct.

Q Now, then, what color did you use to show the bracket below a million and a quarter feet on an initial potential tests?

A Yellow.

Q What is the next bracket and which color is used?

A The next bracket is a million and a quarter to two million and a half and is shown by the blue.

Q Then, what is the next bracket?

A Two million and a half to five million shown in the rose.

Q What is the next bracket?

A The next bracket is five million to ten million shown in the green. The next bracket is from ten million to 20 million as shown in the tan. The next bracket is over 20 million as shown in the dark blue.

Q Has that map been colored with reference to your best estimate as to the area surrounding each well?

A That is correct.

Q You have left no blanks in there but you have estimated the initial potential in places where wells have not presently been completed?

A That is correct.

Q Now, have you conducted a study of the area shown on Exhibit 1-A in an effort to determine the thickness of the net pay sands?

A Yes, I have.

Q What, in general, did you do;substantially, the same things that Mr. Barry did in correlating gamma ray logs and logs of various types with such cores as you had available?

A That is correct.

Q Did you, for this entire area, in connection with your studies over three and a half year period, estimate thicknesses of net pay sand in various portions of the Basin?

A We have.

Q What is the greatest thickness that you have estimated for net pay in any part of the Basin?

A 180 feet.

Q What is the minimum net pay that you have estimated?

A Minimum net pay shown on any well which is presently completed and shown as a Mesaverde well is 6 feet.

Q Then, from the studies which you have made, would you say that there is a ratio in thickness of net pay sand in some places of as much as 30 to 1 between the thickest portions and the thinnest portions of the sand?

A That has been shown to be true by our evaluation of net effective sand thickness.

Q Have you prepared an isopach map with contours showing the thickness of the sands according to your estimate?

A We have.

Q Would you mark the map which has just been put up as an El Paso Natural Gas Company Exhibit 1-B?

A (Witness complies.)

Q Was ... Exhibit 1-B prepared under your direction and supervision?

A It was.

Q Will you tell the Commission what Exhibit 1-B reflects?

A Exhibit 1-B is an isopachus map of the Mesaverda formation, San Juan Basin. It is contoured on intervals of 20 feet isopachus being lines of equal thickness.

Q When you say 20 feet, what are you referring to, the net pay?

A Yes, sir, net pay, effective pay. Just briefly showing and explaining what the map reflects, I have used light and heavy lines to make it more apparent to continuity of sand thickness throughout the Basin. Also to show that from the edges of production sand thickness increases towards the center of the Basin or the center of the producing formation of the Mesaverde formation, producing portions of the Mesaverde formations.

So, just running through the contour intervals here, 0, 20, 40, 60, 80, 100, 120, 140, this instance we got from 120, 140, 160 to 180 feet. The sand pay was picked on a consistent manner on all wells in the Basin.

Q Did you consider the logs of 701 wells in making that isopachus map?

A Every log that was available to the wells completed in the Basin was utilized.

Q Was that essentially all of them?

A Yes, sir.

Q Now, in general, where do you find the thinnest sands?

A On the edge of the producing formation.

Q Where do you find the thickest?

A Towards the center of the producing formations.

Q Did you find in the center of the producing formations, some small portions of relatively thinner sands?

A Yes, sir.

Q What do you find in the way of a relationship between the initial potentials as shown on the Exhibit 1-A and the sand thicknesses as shown on Exhibit 1-B?

A We find a very close correlation in these and these Exhibits were prepared to aid you in visualizing the relationship between sand thickness and the initial potentials of the wells. Showing that generally throughout the field as a whole, that the initial potential increases with increase in net effective pay.

Q What conclusion, with reference to the existence of recoverable reserves,do you draw from this correlation?

A I believe that by presenting to the Commission this next Exhibit that I have and explaining to them what it reflects will aid me in advising them of my consideration of relationship.

Q All right now, the Exhibit which you have, will you mark it El Paso Natural Gas Company's Exhibit No. 2?

A (Witness complies.)

(Marked El Paso Natural Gas Company's Exhibits 1-A,1-B, 2, for identification)

Q Will you state to the Commission what El Paso Natural Gas Company's Exhibit No. 2 represents?

A El Paso Natural Gas Company's Exhibit No. 2 is a plot of average original six hour potential within 20 foot isopachus intervals versus the coring isopachus interval and the average thickness of the interval.

Q Starting down at the left hand corner there, do you have a band that represents wells completed within a thickness of zero to 20 feet and have you put those wells in one band?

A I have.

Q How many wells were there completed in sand thickness of zero to 20 feet?

A Six wells.

Q And have you plotted then the average of the initial potential of those six wells?

A I have plotted the average original six hour potentials in the six wells against the average thickness of the isopachus interval.

Q Those six wells that are completed in that section of zero to 20 feet thickness have had an average initial potential of what?

A 400 MCF per day.

Q Have you taken the 20 foot intervals and in a similar manner plotted the average initial potentials of all wells completed in that sand thickness?

A I have.

Q Would you just read briefly the number and the approximate initial potential average of each group?

A Group 2 in the interval 20 feet to 40 feet had 66 wells, an average initial potential of 1,200,000. Group 3, in the interval of 40 feet to 60 feet had 112 wells with average initial potential of 1,850,000. Group 4 being the interval from 60 to 80 feet, 115 wells with an average initial potential of 2,800,000. The next group was in the interval of 80 feet to 100 feet consisted of 152 wells with an average initial potential of 3,900,000. The next group was 100 to 120 feet consisted of 160 wells with an average initial potential of 4,500,000.

The next group, 120 to 140, 71 wells average inital potential of 5,100,000. The next group in the 140 to 160 foot interval consisted

of 9 wells and average initial potential of 5,700,000. We had two other isopachus intervals, a 160 to 180 which had 1 well with an average initial potential of 5,400,000. We had the interval of 180 to 200 feet consisting of 1 well which had an average initial potential of 14,500,000.

Q What do you conclude from that study of the averages of all the wells in the Basin?

A I concluded from this study that the relationship of initial potential net effective sand thickness is essentially a straight line relationship.

Q That, is there is a direct relationship between net sand thickness and the initial potential of the well completed in that thickness?

A That is right.

Q There maybe individual variances between wells which in part could be caused by mechanical troubles cr methods of completion or one factor or another, is that correct?

A That is correct, that exists.

Q This represents the average of all wells in each sand thickness?

A That is correct.

Q In seeking a formula for proration of gas, what should be factors that should be considered. What is it you want to accomplish by proration of gas?

A Ideal proration is based on reserves underlying the tracts assigned to each individual well, recoverable reserves.

Q What relationship, in your opinion, does deliverability have with the recoverable reserves under any tract?

A I consider that deliverability has a very close relationship to recoverable reserves underlying a tract, as of the time of the taking of the deliverability test.

Q In your opinion, is there a close relationship between the initial potential and the deliverability of wells?

A We have found it to be.

Q Upon what do you base that production experience, production records?

A Yes, sir, and the correlation between potential tests, initial potential tests and the deliverability tests taken on wells.

Q Have you come to the conclusion that the deliverability of a well bears a direct relationship to the recoverable reserves?

A I have come to the conclusion, it bears essentially a direct relationship.

Q From your studies, do you believe that the deliverability of the well is directly related to the sand thickness in which it is completed?

A I do.

Q What wells and leases, acreage, does El Paso Natural Gas Company have in the Mesaverde Field?

A As an operator, El Paso has a whole or partial interest in 390 of the 701 wells which I considered. As a purchasing company, they gather gas from additional 100 wells of the 701, making a total of 490 of the 701 wells.

Q Of the wells which El Paso Natural Gas Company owns in whole or in part and operate, do you find both weak wells and strong wells?

A Yes, sir.

Q Are the wells of all the various characteristics that we have

heard about during this hearing?

A Yes, sir.

Q Does the company have predominantly one type of well or another or do we have all classes of them?

A We have all classes of wells.

Q Incidentally, was it El Paso Natural Gas Company that first developed the technique of drilling in with gas?

A Yes, sir.

Q In the Basin? A Yes, sir.

Q And first took a gas core?

A That is my understanding.

Q First took a core in a well drilled in with gas. Have you spent any time working on the committee that was appointed to study the question of proration in the San Juan Basin?

A Yes, sir, I served on that committee and attended all of their meetings.

Q Have you come to a conclusion as to the type of formula that should be used in the San Juan Basin, in order to most equitably and effectively give each person the recoverable reserves under his land?

A Yes, I have.

Q What, in your opinion, is the best formula for that purpose?

A 75 percent acreage times deliverability plus 25 percent acreage.

Q Why, Mr. Woodruff, do you include any acreage factor at all there, the 25 percent straight acreage?

A I consider that it is important that the Commission give consideration to the economic aspects apparent in this field.

Particularly I refer to the low capacity wells which have been defined hereby previous testimony as possible non-commercial wells. I think that the opportunity should be given to the operator of each well to get the maximum production from that well, essentially to permit it to produce at its producing capacity so long as in so doing, we do not have a number of wells in such marginal capacity that makes the ability to supply the market demand out of the field that takes away the ability of supplying market demand in the field.

Q Are you familiar with the proration rules that are in effect in Lea County now?

A Yes, I am.

Q As I understand the rules, if a well is under produced during the initial six months proration period, it may make up that under production during the next six months according to those rules?

A That is correct.

Q But if it fails to make up the under production, then, at the end of the second six months period, the under production for the first six months period is cancelled?

A That is correct.

Q On the other hand, over production must be made up by cutting back the allowable during the second six months or failing to balance the over production the well is shut in at the beginning of the third six months period, is that correct?

A That is correct.

Q If you have a substantial number of wells that are governed by an allocation that, I believe in this hearing has been called that of a limited well, what do you mean by limited well?

A That as defined in previous testimony and in my interpretation

it is a well which under the application of the allocation formula would receive an allowable in excess of its producing ability, therefore it is limited to its producing ability.

Q In other words, the allowable that it gets is its ability to produce?

A That is correct.

Q Now, then, in the event that well is shut in for any reason then, during that period of time, it fails to make its allowable?

A That is correct.

Q And if its allowable over a period of time is the same as its ability to produce its ability to produce isn't going to increase over that time, is it?

A That is correct.

Q So, that any deficiencies in the under production from a well which is in a limited category and is producing all it can produce can never be made up, is that correct?

A That is correct.

Q Now, if that were to amount to as much as 6 percent in the Blanco Field, I believe the testimony in this case shows that there has been an estimate of 320,000,000 cubic feet a day as the market demand, how many million cubic feet would 6 percent be?

A 19,200,000.

Q Per day? A Yes, sir.

Q Now, then, if over a period of a year, an under production from wells of as much as 6 percent were built up, approximately, how much under production would there be during that year from those wells?

A 700,000,000. No, that is 7,000,000,000, I believe. Just

one second. 7,000,000,000.

Q Unless that under production is reallocated to the wells that will make it,the market for that gas would just not be made?

A That is correct.

Q If you are going to meet the market demand then, as I understand your testimony, it becomes necessary constantly to take gas which has been allocated to the weaker wells and reallocate it to the stronger wells in order that the gas can be produced and the market demand met?

A That is correct.

Q And what type of formula is that, in the first instance rather than by a constant series of readjustments and reallocations?

A 100 percent acres times deliverabilities.

Q And would the formula which you have recommended of 25 percent acreage and 75 percent deliverability be better as a practical matter, a better formula to make an allocation that would more nearly approach the actual production that would be expected over the field?

A It would not be as good as 100 percent acres times deliverability.

Q Would it be better than 75 percent acreage and 25 percent deliverability?

A Much better.

Q If the factor of initial pressure times acreage be used, what would be the allocation formula that would go into effect immediately in this Mesa-verde?

A 100 percent acreage.

Q Why is that?

A Because under initial conditions, most wells have the same

pressure. That statement is not exactly true because there are some variations in pressure throughout the Basin because of variations in depth. Right at this moment, there would be some variations because of some wells having been produced but essentially it would be on the basis of acreage alone.

Q Then, before the formula of pressure times acreage becomes effective, there has to be a partial depletion of the reservoir so that the pressures have gone down substantially?

A That is right, for such a formula to reflect reserves underlying each individual tract, you have to have production, enough production to indicate the reflection of pressure in relationship to reserve. Initially it would not.

Q In your opinion, to apply a formula of pressure times acreage, would start out with a formula that did not bear a reasonable relationship to recoverable reserves?

A That is right.

Q It is only in the future that that formula would gradually be corrected to approach that relationship?

A That is correct.

Q In general, do you have any estimates as to the producing capacity of all the wells in the San Juan Basin Mesaverde, Pictured Cliffs, all the wells?

A The estimated producing capacity is about 500,000,000 per day.

Q And about what is the existing market demand for all markets that take gas from the San Juan Basin?

A Going back to your previous question, my answer was directed to those wells available to El Paso Natural Gas Company.

Q I see.

A I am not acquainted with the delivered capacity of Southern Union's wells.

Q What would be the demand that El Paso Natural Gas Company has for its market at the present time?

A Approximately, 400,000,000 per day average.

Q Does that represent about the maximum capacity of the facilities that El Paso has for transportation?

A That is correct. Actually the 400,000,000 that I mentioned wouldn't be average, it is not the average, it would be more of a maximum because we do not utilize the full facilities each and every day.

Q In your opinion, is there production available from wells completed in the Mesaverda Blanco Field in excess of El Paso's ability to market with relation to the wells connected to its system?

A Did you ask me if there was producing capacity?

Q In excess of El Paso's ability to market from those same wells?

A There is.

Q In your opinion, is it desirable to impose an allocation formula at this time?

A It is necessary to prorate the demand among the wells in the pool in some method.

Q There are a few points that may come up in connection with the rules that might be imposed. What, in your opinion, should be the maximum acreage alloted to any one well?

A It is my belief that the present spacing rule of 320 acres is appropriate.

Q Or with irregular sections, the nearest substantial spacing

unit to that? A Yes, sir.

Q With reference to the balancing periods, I believe that the Lea County balancing periods are January 1, and July 1, is that correct?

A That is correct.

Q Would you think it advisable to stagger the balancing periods as between the Lea County and the San Juan Field?

A It would certainly facilitate the operations of El Paso Natural Gas Company and should facilitate the problems of the Commission in figuring out the balancing at times necessary on the balancing dates.

Q What dates would you recommend?

A March 1st and September 1st of each year.

Q If that were not acceptable, would February 1st and August 1st be better than having it on July 1st and January 1st?

A It would.

Q Would the adoption of those balancing dates give both the companies accountants and the Commission's staff more time to work between peak intervals?

A It would.

Q It would make it easier to operate?

A It would.

MR. HOWELL: That is all.

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

MR. SELINGER: Yes.

By: MR. SELINGER:

Q Mr. Woodruff, in your qualifications you advised the Commission here that you had previously worked for the Texas Railroad Commission,

is that correct?

A That is correct.

Q Were you connected with the Railroad Commission at the time that the allocation formula of the Carthage Field was changed from acreage times deliverability to acreage times pressure?

A I was not connected with the gas department at that time, if I was with the Commission. I do not recall the time of the change.

Q I was just asking if you were familiar with the fact that it had changed it, if you were connected with the Commission?

A No, sir. I do not know whether I was or not. I do not know the dates.

Q Are you familiar with the fact that the allocation formula was changed?

A Yes, I am.

Q Do you know why the allocation formula was changed from acreage times deliverability to acreage times pressure?

A I do not.

Q You are familiar with the fact that it was changed by the Railroad Commission?

A I understand that it was.

Q Making some comments with respect to the acreage times pressure formula, you said that if it was instituted immediately that it would be in effect a 100 percent acreage because you do not have enough production history to have the pressure factor be a dominant one in correcting allowables, is that correct?

A That is correct.

Q When would you have your formula go into effect, immediately also?

A Yes, sir.

Q Of the 701 wells in the field, how many wells have had deliverability tests at this time?

A I am not sure of the exact number that have had deliverability tests.

Q Do you have any idea how many?

A Only roughly.

Q You heard previous testimony to the effect that as, at least of May 16th, there were only 355 wells whose deliverability had been tested?

A I recall testimony to that effect.

Q Are you, also, familiar with the fact that the New Mexico Commission has requested operators to decease reporting such deliverability tests to them because of certain inaccuracies with respect to friction?

A Yes, I am.

Q With all that, then how do you propose the Commission institute gas proration under your formula immediately?

A I do not think it is absolutely necessary that they initiate it right immediately. However, there is a procedure whereby a relationship can be established between initial potential and deliverability which maybe utilized for those wells that do not have deliverability tests until such time as such deliverability can be taken and any adjustment made, that may be necessary because of any inaccuracy in estimate.

Q Then, you propose to calculate the deliverabilities of all those wells that have not, up to this time, had their deliverability test taken?

A I would say that such a method is reasonable and could be

done if the Commission desires to initiate proration at this time.

Q In making your deliverability test, do you not utilize pressure?

A Yes, sir.

Q Can you calculate pressures for those wells who have not heretofore had their pressures taken?

A The initial pressures are known in all wells.

Q The initial deliverables are not?

A Initial potential only.

Q How would you calculate the deliverability of the well that hasn't had the deliverability taken?

A By a percentage relationship.

Q That wouldn't apply to the pressure factor, it would only apply to the deliverability calculations?

A That is correct.

Q What is your opinion, Mr. Woodruff, as to the time that the Commission can institute proration of gas in the Mesaverde formation?

A Excuse me, would you repeat that?

Q Yes. What is your opinion, as to the time?Can they institute it as July 1st, August 1st or September 1st?

MR. HOWELL: It seems to me that is a matter that the Commission is best able to pass on because I suggest this witness isn't familiar with the facilities that the Commission has.

MR. SELINGER: If he is an expert in gas, I think he can give his best opinion to the Commission. The Commission can take it for what it is worth.

MR. SPURRIER: We will be glad to have your opinion if you

want to express one.

MR. SELINGER: That is all I ask, if he doesn't have one, he can say so.

A I think the reasonable time for institute would be September 1st of this year.

MR. SPURRIER: It might give us something to shoot at.

Q How long has the Mesaverde formation in the Blanco Field been on production?

A I do not know. It was produced by other pipelines other than our own, prior to our going into the pool and I do not recall.

Q You don't know whether it is two years, three years or four years?

A I know it is more than that.

MR. SPURRIER: More than what?

Q The institution of proration as of September 1st in four years time of production, you believe, as an engineer, you believe you have insufficient production history upon which to calculate pressure and an allocation formula?

A I do not understand your question.

Q Well, I will repeat it. Do you believe that the production we have had so far to date and the production we will have as of September 1st of this year is insufficient production history?

A To establish an allocation formula?

Q Yes. A No.

Q You think it is sufficient time, sufficient production?

A Yes, sir, I think it is.

Q In calculating reserves, Mr. Woodruff, as an engineer, how do you best calculate reserves, what method?

A Pressure decline method.

Q That is where you plot pressure decline against production or cumulated production, is that correct?

A That is correct.

Q Now, I notice that you recommended the same balancing dates that Skelly Oil Company on the first day of this hearing recommended as the balancing dates, March 1st and September 1st. Have you had sufficient time to look over the recommendations that Skelly Oil Company made with respect to the over and under in this proposed rules which I believe I handed Mr. Howell a copy of the first day?

A Mr. Selinger, I have looked at them, I am not entirely familiar with them or I have forgotten quite a bit that is in them as to the exact nature of them.

Q What is the purpose of establishing an over and under and adding it into your operational field rules?

A Well, it is to give flexibility of operation.

Q And it is also to assure the market demand be produced from a field in order to satisfy that market demand, is it not?

A It is to ease the satisfaction of market demand.

Q Then, you are not prepared at this time to say whether or not Skelly's Oil Company's recommendations on this proposed rule for over and under accomplishes that purpose as it is written and proposed by Skelly?

A Was your question, am I prepared to say whether your rule accomplishes that purpose?

Q Yes.

A No, I am not.

MR. SELINGER: That is all.

MR. SPURRIER: Anyone else have a question of Mr. Woodruff? Mr. Foster.

By: MR. FOSTER:

Q Mr. Woodruff, in order to establish friendly relations with you, I want to say that I have known you a long time, and I have a very high regard for your ability.

A Thank you, I never realized our friendly relations had ceased.

Q Well, I am just warning you that they might. Do you have some apprehensions that under the formula proposed this morning by Phillips Petroleum Company, that the market demand of the field wouldn't be met?

A I do.

Q Will you just tell us wherein that would occur?

A It is my opinion that the large number of marginal limited restricted wells, those wells with allowables equal to their maximum producing ability--

Q (Interrupting) Or greater?

A With allowables limited to that would result in such inflexibility that market demand could not be met. Now, we know that the demands of El Paso Natural Gas Company, speaking only for them is a very fluctuating demand. That means that every day during the month you can not take a constant volume from all wells. During the times when our system has to be cut back, that means that such a well with its maximum producing ability as its allowable would produce something less than the allowable. Such a well would not be capable of producing over its producing ability and therefore can not make up that portion of the allowable which was under produced.

Adding up that fact, or multiplying that fact by the number of wells in the pool could represent a sizeble portion of the total market demand which would be unproducable from those wells.

Such market demand could be produced from wells that were not restricted, that were not marginal as such over production which would be accrued by those wells, would have to be made up by subsequent under production so that at the time that could be compensated for but would have to be accounted for sometime in the future.

Q Now, I thought you said that this formula would accomplish at the out set what these other formulas would accomplish at some other time in their production history of the field. If that is true, I don't understand how you share any apprehension about market demand not being met under the formula that was proposed by Phillips Petroleum Company.

A I do not recall having discussed or testified to Phillips Petroleum Company's formula.

Q Well, that is the only other one that is before the Commission--

A (Interrupting) Judge Foster, I assume that I have heard it mentioned, see, if I can answer your question.

Q I understand you want to answer the question. I am just trying to get at the facts now.

A Yes.

Q If you find something in that inherently wrong, in the type of formula that was suggested that would prevent the market demand from being met?

A I think that any formula--I need a word.

Q Tell me what it is, I will give it to you.

A Any formula that goes away from 100 percent acreage times deliverability would cause increasing difficulty, going away from deliverability to acreage would cause increasing difficulty in meeting market demand.

Q Well, now, let's take the formula that is in use in the West Fields Panhandle/in Texas, you are very familiar with that field. That is what we call one third to two thirds formula. It is one third potential plus two thirds acreage times rock pressure. Now, that field has about 2100 wells in it. It is presently operating with some 600 so-called limited wells in it and you know that the market demand is being met daily in that field, do you not?

A I do not know.

Q Well, I will tell you that it is.

MR. TURNER: Take the stand.

MR. FOSTER: I will be glad to.

MR. SPURRIER: Your comments will be directed to the Commission, Mr. Turner.

Q Now, you know of other fields where a similar formula that I have mentioned here are in operation and where the market demand in those fields is being met, do you not?

A I do know that there are fields with such formulas, I do not know whether the market demand is being met in them.

Q Do you assume that other Commissions would permit formulas to be adopted that would result in the field not being able to meet its market demand?

A It is entirely possible.

Q Do you know of any such instances?

A I said I did not know of any field where the market demand

was not being met.

Q Do you know of any field in Texas where you operated for a number of years in a very high and responsible position with the Commission of that state, where there was a formula ever adopted by the Commission that did not permit the meeting of the market demand in that field?

A Judge Foster, I do not recall any specific field. I do know of numerous instances where it was very difficult to meet market demand and actually think the market demand was not met. I can not mention a specific instance.

Q Are you talking about the difficulties of meeting the market demand or are you talking about a formula having been proposed here that wouldn't permit the market demand to be met?

A Difficulties.

Q All right now, then. That shades it a little bit. Now, I realize, of course, that there are difficulties in operating but also you, as an engineer of ability, must realize that there are other considerations that must be taken into consideration and such as the protection of correlative rights?

A Absolutely.

Q Now, we have got to find a ground somewhere on which we can operate so as to bring about both of these things?

A Correct.

Q Now, I don't take it, in your judgment, that you would advocate the adoption of a formula that would make it more pleasant or easier for pipeline companies to operate, which at the same time does not protect correlative rights in the field? You wouldn't do that, would you?

A I think both problems are important for the Commission to consider. I would not recommend that one be considered without the other.

Q You wouldn't recommend either the adoption of a formula by this Commission that would bring about the unratable takes of gas as between wells, would you?

A Not unless in so doing it was necessary to do so to be able to prorate the gas.

Q Well, are you saying--

A (Interrupting) Let me restate that.

Q I understand what you are trying to say.

A Does the Commission understand what I tried to say?

MR. SPURRIER: No. Let him ellaborate, Judge.

A I think--

Q (Interrupting) Are you saying--

MR. HOWELL: (Interrupting) Judge, the Commission asked to have him ellaborate.

MR. FOSTER: I thought he was directing his remarks to me. I beg your pardon. I thought he wanted me to question him further on that. If Mr. Spurrier has a question, all right.

MR. SPURRIER: Can you ellaborate on that last statement?

A I will try. I think that it is very important to protect correlative rights. Correlative rights, if I can express myself, can be protected only, so far as I see it, you must be able to prorate gas in such a manner as to fulfil the market demand otherwise you don't have the market demand because you only maintain it by fulfilling it. So, you can not restrict a pool because you have a well or a few wells in there that can't produce their reserve in the period

of time that the demand would have to be taken out. You must prorate the field as a whole and prorate in such a manner that market demand is met.

Q You are saying that if in order to meet the market demand, you got to violate correlative rights, you advocate the violating of correlative rights?

MR. HOWELL: That isn't what he said.

MR. FOSTER: I am asking him if that is what he said.

A I consider, as I said, that if you want to maintain the market demand, you must allocate the gas in such a manner that market demand is allocated to the wells.

Q Very well.

A If in so doing, you result in assigning, say, restricting some wells, it could be that their ability to produce is caused by some peculiar coordination in the well bore. You can't restrict the field because that condition exists. By going on and prorating the field, you might permit some off setting well to take more gas than that well would take in relationship to their reserves but the Commission could not restrict the field because of that condition.

Q If you were faced with the alternative of either meeting the market demand or hurting correlative rights, what would be your recommendation?

A I think my answer to that, would be that if you do not have producing ability in excess of market demand, the Commission is not designated to prorate gas.

Q That is not the question. If you were faced with operating conditions in the field where you would take your choice between meeting market demand or violating correlative rights, what would be

your recommendation?

A Well, I would say that if--I hardly know how to answer your question. I don't believe you could meet market demand, that doesn't work out to my thoughts, either. I think that if you protect correlative rights by an allocation formula and can meet market demand that that is the appropriate way.

Q I agree with that, but I am giving you a case here where you can't do that. Where you are faced with the alternative of either meeting market demand or violating correlative rights which horn of the dilemma would you take, what would you recommend that this Commission do?

A I don't think that we are confronted with that, Judge Foster.

Q Well, you have an apprehension that we are going to get in that situation.

A I believe then, I should answer, fulfil the market demand for this reason; if you can't protect correlative rights--

Q (Interrupting) That answers my question.

A It must mean that that well is incapable of producing its allowable and necessarily would be restricted to its producing ability, in other words, would get its proper share of--

Q (Interrupting) If you were faced with that alternative, your answer is that you would recommend the violation of correlative rights?

A I prefer to answer it in the manner in which I answered it.

Q Now--

A (Interrupting) Still friends?

Q Oh, yes, very much so. Now, the adoption of over and underage rules, it is common in all prorated fields, isn't it true?

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A I believe that is correct, all of them I am acquainted with.

Q Any area that you know anything about?

A Yes, sir.

Q Do you know of any field in any State where the Commission does not reallocate the cancelled underage so as to maintain the field in balance with market demand regardless of the formula that is used?

A I do not know of any.

Q In fact, you know of a good many areas where there is proration under a type of formula such as has been suggested here by the Phillips and by Skelly where the Commission does reallocate the cancelled underage so as to maintain the field balance?

A That is correct.

Q That is true in the Texas Panhandle Field. That is true in the Texas Hugoton Field. That is true in the Kansas Hugoton Field. That is true in the Oklahoma Field, is it not?

A I believe that to be correct.

Q So, that there really is no need, I will ask you if you sincerely feel that there is any need to adopt a particular type of formula in order to keep the field in balance?

A Yes, I do.

Q You feel that the type of formula itself is the thing that keeps the field in balance?

A I think it adds to the ease of keeping the field in balance.

Q Oh, I am not trying--

A (Interrupting) Or the possibility of it.

Q I understand that, but I am not trying to feel easy right now.

A I see.

Q I am simply trying to find out whether or not within your

conscience, thinking as an engineer of great ability, you feel that it is necessary to adopt a particular type of formula in order to maintain field balance?

A I do and particularly so in the fields in the San Juan Basin.

Q Well, now then are you saying to me that unless your formula that you have suggested is adopted that the San Juan Field cannot be maintained in balance?

A I believe that condition will exist.

Q Are you saying to me that if you adopt the formula suggested by Skelly or if you adopt the formula suggested by Phillips, that inherent in those formulas is something that wouldprevent this Commission from keeping that field in balance?

A I don't think there is in theory, there is anything that prevents it but I think in actual operations there certainly is. You allocate the market demand in any type formula but the ability to produce it becomes increasingly difficult..

Q I appreciate your apprehensions about it. I understand. Do your wells have an ability to meet your market demand?

A Yes, sir.

Q How can proration cut the ability of your wells to meet the market demand?

A By allocating excessive amounts of the market demand under an allocation formula of the type you suggested.

Q That doesn't affect their ability, does it?

A Under the type formula that you advocate or your company advocates, we have this large number of marginal wells with an allowable equal to the producing ability of those wells, market demand could not be met during the periods of severe fluctuation without over producing other wells. The wells which were prorated. Such over production would have to be made up by subsequent under production so this volume of under production of these wells would have

to be made up, could not be made up from the wells which accrued them.

Q Is there any proration formula that operates on the ability of the well to produce?

A You mean say like deliverability alone?

Q Well, is there any proration formula that you know of that changes the ability of a gas well to produce gas?

A No, sir.

Q All right. All the proration formula does is to allocate to each well its proportionate part of the gas on whatever basis you want to allocate it?

A That is correct.

Q So, it does not operate on the ability of that well to produce?

A If such an allocation formula results in marginal or limited wells as they have been defined here, it does.

Q Well, most assuredly, any proration formula may result in these marginal or limited wells.

A Not to such an excess nature as the one that Phillips has advocated here.

Q We are now talking about a matter of degree?

A That is right.

Q That is all we are talking about. I can't understand how, and I would like for you to explain to me, if you can, for the record, how any proration formula, the one suggested by Skelly, the one suggested by Phillips, the one suggested by you, could operate to restrict the ability of your wells to produce gas?

A They could not restrict the ability of our wells to produce

gas.

Q All right. Now, if an allocation formula in allocating among gas wells in the field allocates more gas to a well than that well has ability to produce, you agree with me do you not, that the well at least has the right to produce up to its ability?

A That is correct.

Q All right. Then, the amount which a formula, any formula, yours or the others that have been suggested, allocated to that well should then be redistributed to the other wells in the field so that the market demand may be met, isn't that true?

A I believe that your statement is true.

Q All, right, that procedure can be accomplished --

A (Interrupting) May I qualify--

Q (Interrupting) Okay--

A (Interrupting) I would like to complete my statement. The market demand will be allocated to the wells in the pool.

Q If that procedure is followed?

A That is right.

Q That is true, regardless of what the formula is, is it not?

A That is right.

Q Okay.

A If there is producing ability in excess of market demand.

Q If there is producing ability there. That is why I say the formula doesn't operate on the ability of the well to produce?

A No, sir.

Q All it does, is tell the well how much gas it is permitted to produce under the applicable formula and that is all that happens?

A That is right.

Q So, that are you saying now, that under any type of formula, that is adopted in this or any other field, that if you take the gas that is allocated to those wells which can not make their allowable as distributed to them by the formula and reallocated that gas among the other wells in the field, the field will be kept in balance so that the market demand can be met?

A Under your example, absolutely, but you can not produce the allowable of those marginal wells every day.

Q Now, that is not the fault of the formula, is it?

A No. That is a fault of the nature of the animal that we are faced with here.

Q Where is the fault, why is it those wells can't do it?

A Because of the fluctuating market demand.

Q Well now, you have a fluctuating market demand under any type of formula, would you not?

A Not so severe as we are experiencing and will experience in the future.

Q The formula doesn't fix the market demand?

A But the volume must be one that will enable market demand to be distributed to it, can be produced.

Q Any formula that you use in the field in allocating gas between the wells where the Commission follows the practice of reallocating the production of the wells that cannot make their allowable allocated to the formula, the market demand can be met?

A My same answer goes with that question.

Q That is true.

MR. SPURRIER: We will take a short recess.

(RECESS)

MR. SPURRIER: The meeting will come to order. Judge Foster, were you finished?

MR. FOSTER: I believe that is all at this time.

MR. GRENIER: A. S. Grenier, Southern Union.

By: MR. GRENIER:

Q Mr. Woodruff, you recall that Judge Foster asked you one question regarding what you would do if you were faced with a situation where in order to meet market demand for your pipeline, you would necessarily have to violate correlative rights in order to meet that market demand. Do you remember that series of questions?

A Yes. sir.

Q Do you feel that the questions of that sort and in the actual living world are questions which are to be answered by the pipeline company as the final arbitor, or by somebody else?

A I believe it is actually up to the Commission to weigh and value the going either direction rather than for the pipeline company to decide.

Q In other words, some public body, whether the Commission, who has the authority to settle such matters or the Legislature, itself, to lay down standards to take care of such matters?

A That is right.

Q Rather than the pipeline assuming to decide the thing on the basis of its own judgment?

A That certainly is my opinion.

Q If you were on such a Commission or member of such legislative body, would it make any difference to you what the character of the load was in attempting to answer that problem?

A Certainly, I think that it would.

Q What factors would you consider in that regard?

A Well, I would consider the nature of the demand for the gas, whether it was for light and fuel to maintain the heat in the people's homes and generate the electricity, , whether it might be for some plant for commercial use.

Q If there was some substitute fuel readily available such as coal or oil, you would think there was more reason to protect correlative rights as opposed to convenience of the power plant operator or industrial plant operator, is that correct?

A That is correct.

Q If the gas were being used to cook and heat the homes of people in the winter season and if there were no readily reasonable substitute, you think that should be taken into account?

A Certainly do.

Q What is the annual load factor of your pipeline, El Paso's Natural's pipeline, the one extending from the San Juan Basin to California?

A I don't know. I can, I am sure that I could find out that information. It may be that a subsequent witness will be able to give us that.

Q Oh, you have more witnesses, fine.

MR. GRENIER: Mr. Howell, if one of your witnesses could give us an approximate figure on that, we would appreciate it.

MR. HOWELL: If this witness can't, we have somebody who can and we will make it as a statement.

MR. GRENIER: Thank you.

Q In Lea County, I believe your pipeline is connected to a few wells down there, is it not?

A Yes, sir.

Q What is the formula being used down there?

A 100 percent acreage.

Q Are there any wells down there which would fall in the category of what we might call limited wells as that term has been used here? A Yes.

Q Has your pipeline as yet through operations of the proration in that area been unable to meet its market demands?

A No.

Q In a 100 percent acreage formula, does that have more or less limited wells than one that proposes 75 percent acreage and 25 percent deliverability?

A I would believe that it would have more.

Q And it would have yet more than one proposing 50-50 relationship or one such as Phillips proposed of 25-

A (Interrupting) That is right.

Q (Continuing)--of 25, 75-25 percent deliverability times acreage and--

A (Interrupting) Are you asking me what a 50-50 would have?

Q (Continuing)--less, would 50-50 have less limited wells than a 100 percent acreage?

A Yes, I believe.

Q Would the Phillips formula also have less limited wells than 100 percent acreage?

A I consider that it would.

Q As yet, even though in Lea County, you are not on a 100 percent acreage times deliverability, no particular operating problem has arisen as respects inability of the field to meet the

the market demand under that proration formula?

A Actually, proration has been in for a very short period of time and during a period of minimum demand. I do not know what complications may arise.

Q So, you are not in a position based on Lea County experience, to say just how much harder it will be to operate under one of the formulas than the other?

A That is correct.

Q Referring to your Exhibit, one A and one B, and I call your attention particularly, if you will join me at the map, to the area in 31, 10, there is a fairly large area in here, is there not, Mr. Woodruff, which appears to be between the 100 and 120 isopachus lines, is that right?

A That is correct.

Q Within that area, how much variance do you find just in this single township area as between the initial potential of the wells as shown on the underlying isopotential map?

A The maximum that I see is 26,800,000 for initial potential. 4,447,000.

Q So, there is a ratio of approximately four to one variance in an area of approximately identical sand thickness, is that correct?

A There is.

Q Well, the ratio, you are essentially correct from what this represents on my mention that no log was taken on this large well, so, we have no way of knowing what the sand thickness was in that large well?

A Unfortunately that is true in most of the large wells that

are in the San Juan Basin, the Mesaverde formation.

Q So, as to the large wells then, the map is somewhat less reliable as it is, as to the small wells?

A I believe that is correct. We do show an indication of greater thickness on the large wells that we have logged as I said a majority of large wells do not have logs.

Q According to your Exhibit 2, Mr. Woodruff, I observe that, that what you have done here is to take averages of wells in various sand thickness,grouping them together and then plotting them in terms of their potentials so as to arrive at this straight line relationship which you observe, is that correct?

A That is essentially correct.

Q Have you made any study to determine what the average deviations from that straight line is per well? That is to say, had every well been plotted, would you have any ideas as to what the pattern might look like?

A No, I would not have, my study was made on the pool width which is what we are prorating.

Q That, of course, might be made on a pool width also to see if there was a relatively close correlation to the line or merely a relatively balanced shaped spread here which you could draw a line through in almost any direction, isn't that true?

A I would not expect it to occur.

Q Well, I wouldn't expect it to occur in the shape of a complete circle either but I would expect and would you not, also, that there might be rather material variances on either side of that line?

A There may be.

Q You have not made studies to determine what the extent of that variance might be? A No.

Q You have not expressed any opinion as to how closely the various wells in the field do track this central line?

A I think, on an average that it would track that.

Q I see, you have one rather unusual well over here, did this well which is the one in the approximately, the 190 foot range, did that well have a log on it, Mr. Woodruff, so that you do have an accurate sand group or not?

A Yes, it does.

Q So, here is one fairly clear wide variance from the line at least?

A That is right.

MR. GRENIER: I believe that is all.

MR. SPURRIER: Anyone else?

MR. SMITH: Mr. Smith, Stanolind.

By: MR. SMITH:

Q How many core analysis did you have available for study?

A We studied 14.

Q Were any of those 14, the same as the ones that were used by Mr. Barry in his testimony?

A I am not sure.

Q What did you find in the way of average porosity from one well to the other? What is the range of variance there?

A My recollection is that it varied somewhere averaging the whole net effective pay, taking each well between 7 and a fraction to 13 and a fraction.

Q Individual samples in some of the cores, did they run even

higher than that?

A Yes, they did.

Q What was the highest individual sample that you observed?

A The highest that I recall was 21.3 percent porosity.

MR. SMITH: That is all.

MR. SPURRIER: Anyone else?

MR. TURNER: I have a question.

By: MR. TURNER:

Q Would you tell us for the record, Mr. Woodruff, about, approximately how many miles of natural gas pipeline that El Paso Natural Gas Company operates?

A I believe, Mr. Turner, that will have to be the subject of the subsequent witnesses testimony. I do not know.

MR. TURNER: All right.

MR. SPURRIER: Mr. Reeves.

MR. REEVES: I would like to ask one question.

By: MR. REEVES:

Q Your reason for recommending 25 percent acreage plus 75 percent deliverability times acreage, was it not that, your belief that represented a fair ratio of reserves under the individual wells?

A Yes, sir.

Q And you believe that would place the operator in the point of producing proportionately to the reserves under each well?

A I think it will reasonably do so.

Q One more question then. In your opinion, would the formula suggested by Phillips permit that sort of production? That is equitable production in proportion to reserves?

A In my opinion, it would not.

MR.REEVES: Thank you.

MR. SPURRIER: Mr. Arnold.

By: MR. ARNOLD:

Q Do you consider the Mesaverde pool to be one reservoir?

A Yes, sir.

Q As defined by the Commission?

A Yes, sir.

Q Approximately, what method did you use in determining the net pay from the logs, the gamma ray induction logs? What approximate values--

A (Interrupting) What approximate what?

Q Values?

A My work has been on a general overall nature. I aided in setting up the basis for this but I do not recall the particular limits on each type of logging method which was utilized in picking the net effective pay. This map was prepared with my aid and under my supervision and with my cooperation but I did not pick each individual well's net effective pay. It was done in our office.

Q You don't know what those values were that were used?

A No, I do not know. I do not recall.

Q Using average porosity and connate water values, what net pay thickness, I mean how far could you reduce the net pay thickness to reach what you would call a commercial well?

A The well that is completed as a Mesaverde well with the least pay is 6 feet.

Q But if you converted that to reserves under the tract, would you consider that a commercial well?

A No, I wouldn't, but I do not know at what point I would say a commercial well existed. It is very difficult to define a commercial well. What is commercial for one company, may not be commercial for another company.

Q I wanted to ask one question about the 21 percent porosity. Was that a maximum value for one foot, was it an average value?

A That was a maximum value for a single sample that I recall.

MR. ARNOLD: That is all.

MR. SPURRIER: Anyone else? Mr. Maxwell.

By: MR. MAXWELL:

Q I would like to ask if a 100 percent deliverability times acreage formula with a minimum allowable actually supports your reservoir calculations in direct testimony with respect to relationship between recoverable reserves and deliverability as well as your 75 percent deliverability times acreage plus 25 percent acreage formula?

A I would say essentially, yes.

Q Would you expect to be under any obligation with respect to a minimum, should this marketing condition get so severe that you couldn't sell even the minimum per well?

A I do not believe, Mr. Maxwell, that I understand what you are asking me.

Q Well, if you have 700 wells and a minimum allowable of 250, say that the daily allowable, what is the figure 700 times 250, if your allowable would get under that figure, would you have to take the gas and flare it or would you consider yourself under any obligation then?

A I do not believe that I would consider that we were under

obligation, however, a minimum which would result in an allocation greater than market demand, I believe, if I may interpret the Statute would be unlawful because it would permit non-ratable takes.

Q Would the 100 percent deliverability formula tend to equalize pressure and tend toward an allocation formula?

A I believe that it would.

Q Would a minimum thrown into 100 percent deliverability somewhat ease the economic strain for delinquent wells, limited capacity wells?

A Such was my previous testimony with respect to 25 percent acreage.

Q Would a 75 percent deliverability formula actually benefit the under average wells at the expense of the overage?

A It would in a comparison of the two formulas.

MR. MAXWELL: Thank you.

By: MR. SELINGER:

Q How about the acreage times pressure formula, you wouldn't have that minimum to interfere with a depressed market, would you?

A I think I can figure out what you are saying.

Q I will repeat the question for you. I said, under an acreage times pressure formula, under a depressing market, you wouldn't be embarrased by any sort of a minimum, would you?

A No.

MR. SELINGER: That is right. That is all.

MR. SPURRIER: Anyone else?

MR. UTZ: I have one question, please.

By: MR. UTZ:

Q Mr. Woodruff, on any contour, on your isopach map up there,

where you saw a constant thickness, do you have a variance along that line of initial potentials?

A I believe that the answer is yes to that, if I understand your question. Certainly, initial potential does not, the initial potential curve does not coincide with the--

Q (Interrupting) I just want to be general about the thing.

A Yes.

Q Where you do have a variance in initial potential along contour of equal thickness, you are not saying, are you, that the reserves under those two wells are in direct proportion?

A Now, do I understand your question, that if there was a well, say, in the light blue on one side of an isopotential line and on the other side, that I would necessarily say that the reserve was the same?

Q What I am asking you is, Norman, is that a contour of equal thickness, if you have two wells say, as an example, one well is a million, the other is five million, if you do have such a spread and I imagine you do have, you are not saying that the reserves under those two wells is a ratio of one to five?

A They may be.

Q They may not be, too?

A Yes, they may not be. I do not know. There maybe some peculiar circumstances such as has been pointed out here concerning the completion practice, the completing of wells that may have resulted in that condition.

Q In your completion practice, you do get a variance in the amount of increase you get by whatever completion method you use, don't you?

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A There are good methods and bad methods, yes, sir.

Q In other words, say, two million wells on the same contour if you treated both alike and you got three million on one after treatment and five million on the other, that wouldn't mean that you had increased the reserves on the big well, would it?

A It wouldn't mean that I had increased the reserve, may have increased the recoverable reserve for that well. You are comparing of course, only variations in thickness when you are asking me to correlate it with reserve and there are other variables which enter into the reserve calculations which could also have influenced the variance in initial potential.

Q Do you have an opinion as to how much the reserves might vary between the offset wells?

A No, I do not.

Q It wouldn't be anything like a method of 1 to 30 which you stated between your 6 and 100 feet?

A It is possible. I do not know.

MR. UTZ: That is all.

MR. SPURRIER: Anyone else?

MR. FOSTER: May I ask one more question, please?

By: MR. FOSTER:

Q You used there in answer to Mr. Utz's question, might increase the recoverable reserves? What do you mean by that?

A The reserves which are available to the well bore.

Q Well, you don't mean that that would put any more gas in the well bore or beneath the land?

A Certainly.

Q It would? A Yes, sir.

Q The method of completion, treating of the well would put more gas between the land?

MR. HOWELL: That isn't the question, you asked, you said in the well bore and he answered you, yes.

MR. FOSTER: I will strike that question and ask another.

Q What I am trying to find out is you used the term and you told Mr. Utz that treating the well, and I suppose he had in mind shooting it, may increase, the recoverable reserves. Now, what I want to know is, are you saying by recoverable reserves that this treatment of the well or the shooting of it will put more reserves beneath the land on which the well is located?

A It may do that, yes, sir.

Q How?

A By opening up and making available to the well bore, sand stringers which may not be connected into the well bore but ended somewhere near to it.

Q It is all one reservoir, is it not?

A It is considered all as one reservoir. It is not one homogenous formation.

Q Now, the method of completion that gas was already there, was it not?

A Yes, sir.

Q The shooting didn't put it there?

A No, the shooting made it available to the well bore to be produced.

Q It made it so that you could produce whatever reserves you had at a greater rate?

MR. HOWELL: He didn't say that, Judge. We object to the

99 question the Judge--

MR. FOSTER: (Interrupting) I will withdraw the question.

MR. HOWELL: I would like to make an objection if the Commission please. I think I was ultra-patient in allowing the question to be asked five or six times.

MR. SPURRIER: I think you were too.

MR. HOWELL: I now request if the Judge is going to continue to question the witness that he please quote the witness correctly when he asks the question the second time.

MR.FOSTER: I had no intention of misquoting. I think the record will speak for itself.

Q What I am trying to get at is this; I will ask you if this is a fact that when you shoot a well that all that does is if it does anything for it, is to increase the rate at which you may be able to produce the reserves under the land.

MR. HOWELL: We object to that question, it has been asked before and answered by the witness.

MR. FOSTER: If it has, I didn't get it. It wouldn't hurt anything for him to answer it again. I don't want him to be repetitious.

MR. SPURRIER: The Commission has heard it before, asked and answered.

MR. FOSTER: Would someone mind telling me what the answer was.

MR. HOWELL: You didn't like what you got, Judge. He answered you. He answered it, that it would open up some stringers that might not otherwise be connected to the well bore and would thereby make the gas available to the well bore which otherwise might not be produced.

MR. FOSTER: Thank you.

MR. SPURRIER: Anyone else? Is that all, Judge?

MR. FOSTER: I wanted to ask him one question as to what the relationship is between initial potential and deliverability?

MR. SPURRIER: Very well. Did you hear him?

A I heard him. Approximately 18 percent to 20 percent.

MR. FOSTER: That is all.

By: MR. GRENIER:

Q Does that relationship vary at all with the size of the well, Mr. Woodruff? Is it consistent all the way up and down the scale?

A I can't recall individual instances, Mr. Grenier. I do recall the overall average.

Q You didn't observe from a study of Phillips Exhibit No. 3, what the relationship, as indicated there was, between average deliverability and average initial potential and any variance that there might be between that relationship as to wells of different sizes?

A I do not recall what his exhibit showed.

MR. GRENIER: That is all.

MR. SPURRIER: Anyone else?

MR. JONES: A couple of questions, please.

MR. SPURRIER: Mr. Jones.

By: MR. JONES:

Q Mr. Woodruff, as I understand it, there are a number of ways of completing wells in the Mesaverde Pool. I think there is sand-frac shooting, maybe hydra-frac, is that correct?

A That is my understanding.

Q These various methods in effect convert more of the gas in place under a particular tract into recoverable reserves, is that correct?

A That is correct.

Q In other words, fissures are opened up out into the formation by these methods, is that correct?

A That is correct.

Q These methods are in effect conservation methods are they not?

A I consider them to be.

Q In other words, they permit the production of gas which without their use might remain down there and never be produced, is that correct?

A That is correct.

Q These methods cost money, do they not?

A Yes, sir.

Q And these methods result in higher deliverabilities, is that correct?

A That is correct.

Q Then, one question. By putting a high deliverability factor in an allocation formula, are we not giving the operators an incentive to better completions and better conservation practices?

A It certainly would. I think that such an incentive should be considered and should be given because it is only with the increasing and better techniques of completing wells and maintaining deliverability, can we first hope to maintain our present market outlets and second, to increase our market outlets in the future.

MR. JONES: Thank you, Mr. Woodruff.

MR. SPURRIER: Anyone else?

MR. UTZ: I would like to ask one more, please.

By: MR. UTZ:

Q Mr. Woodruff, in arriving at your 75 percent, 25 percent acreage, 75 percent deliverability formula, did you consider a ratio of reserves over the field?

A I believe my answer would be yes to that.

Q In other words, what is your ratio in reserves over the field?

A Well, I do not understand your question apparently.

MR. SPURRIER: You mean between drilling units? I don't, either.

Q Between drilling units?

A No, I have not compared one unit to the other unit. I have made my study on the pool as a whole which is what is being prorated.

Q Do you know what the maximum to minimum reserves are in the field? Do you have an opinion on that?

A Well, it would be closely related to the relationship of sand thickness as a maximum and minimum which I previously testified to.

Q That was 1 to 30?

A 30 to 1, that is right.

Q You say the reserves are 30 to 1 then?

A Yes, I would think that the reserves certainly could vary in that pool, 30 to 1.

Q That would depend on how far you went out in the field too, wouldn't it?

A In this instance, we have a well completed designated as a

Mesaverde well which has 6 foot net effective pay--

Q (Interrupting)a commercial well?

A I do not consider it to be but it has been completed and it is in that condition.

Q Don't you think that in arriving at a ratio of reserves we should consider a point somewhere in the neighborhood of what we might feel is the commercial well or commercial thickness?

A Well, our feelings don't govern the persons drilling the wells. It is up to them to do that if they desire to do so.

Q If you completed a well in one foot of pay, the ratio would be 1 to 180?

A That is correct.

MR. UTZ: That is all.

By: MR. FOSTER:

Q What would it be if you call it a dry hole?

A They call it infinity.

MR. SPURRIER: Anyone else?

By: MR. MACEY:

Q I am not going to ask you about correlative rights or reserves or anything. I am going to talk to you about mechanics.

A Mechanics?

Q Yes. I believe it has been testified that a great number of the wells in the Basin do not have deliverability tests reported on them, is that correct?

A Yes, sir.

Q How, would you propose that this Commission establish allowables as of September 1st in the absence of the deliverability tests on the wells?

A I would recommend that the Commission determine a reasonable relationship between the deliverability and the reserves of those wells which we do have tests on apply that relationship to the initial potential tests of those wells and at such time that deliverability tests are available to reallocate the gas to those wells based on the deliverability test and make such corrections as are necessary.

Q Would you recommend that 18 to 20 percent figure that you mentioned a few minutes ago as a starting point?

A Based on the wells that were available at the time that the study was made. I think it would be well to redetermine the relationship based on the additional information available.

Q Are you familiar with the testing procedure in the Basin?

A Generally so.

Q Are you aware of the fact that the testing procedure calls for a session of deliverability tests from October 31st to, I believe, April 1st?

A Yes.

Q If you had a well completed in the first week of November, you did not have a deliverability test taken on that well, you would come up to the end of the balancing period without any concrete allowable that you could assign that well?

A Well, that certainly could occur but I don't say that it couldn't be reconciled by the calculation of an actual allowable by using deliverability, once it was available.

Q How would you balance if you didn't have anything to balance with? If the figures that you used were fictitious figures or temporary figures?

A I don't see that there is a problem in balancing. You would have your figure there of over or under production due to the relationship of what you had given as the estimated allowable and then what you would give as the final allowable after the deliverability test was available.

Q Well, I don't particularly agree with you but I am not going to go any further.

By: MR. UTZ:

Q How would you estimate the deliverability on that well?

A I would estimate the deliverability by applying the relationship which you would determine between the deliverability and the initial potential of those wells which you had tested by applying that relationship to the initial potential of the wells that had no deliverability test on it.

Q By the time the well was tested, the next testing system on the basis of that estimate would, you think it would be off enough to be brought in balance in six months?

A Well, I can not positively say, however, it would certainly be to the advantage of the operator to test his well to make a deliverability test on the well as soon as possible, otherwise he would be penalizing himself by not having done so; because with production goes decreased deliverability. Maybe the solution is to shorten your period of deliverability test or set up some procedure whereby a new well would have a deliverability test taken on it soon after it was completed or connected to the pipeline.

Q Do you recall us having discussed that at one of the committee meetings?

A I do not recall but it may well have been so.

Q We did. We estimated that the estimated deliverability would be fairly close deliverability. That was the answer I wanted.

MR. UTZ: That is all.

MR. SPURRIER: Mr. Woodruff, if you advocate the 20 percent figure of potential to substitute for deliverability, do you feel that it is wrong to use that figure beyond six months providing that you can't get a deliverability test in that six months?

A Yes.

MR. SPURRIER: Why?

A I think that the well should be shut-in and the pressure taken at that time which could be utilized in revising the initial potential, to core that pressure and then you could apply that percent if you wanted to, but it probably should be resorted to some individual consideration rather than an overall rule to do that.

MR. SPURRIER: Anyone else have a question?

MR. UTZ: Yes. In regard to that question you are just asking. You are asking for a change in the present deliverability procedure?

A I wasn't aware that I was doing so.

MR. UTZ: I think you were because if the well is not tested by October the 31st, then it shall not be tested until the following deliverability testing season, which is from April 1st to October 31st, the following year.

A I believe, Mr. Utz, the question was directed to wells that could not have their deliverability taken.

MR. SPURRIER: That is right.

A That was what my answer was made for.

MR. UTZ: I see. That is all.

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MR. SPURRIER: Anyone else? The witness may be excused.

(Witness excused.)

MR. SPURRIER: Mr. Howell, do you have another witness?

MR. HOWELL: We have another witness. Mr. Striklin..

J A C K M. S T R I K L I N

the witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By: MR. HOWELL:

Q Will you state your name for the record?

A Jack M. Striklin.

Q What position do you hold with El Paso Natural Gas Company?

A Division superintendent, San Juan Division.

Q Is the dispatching of gas and the operation of the gathering system and getting the gas into the main line directly under your supervision?

A Yes, sir.

Q Now, in order the Commission may have some estimate of the market in the future, so far as El Paso's market is concerned, has the company prepared some charts there showing the estimated peak days and the capacity of the entire system projected over a period of a year or two?

A They have.

Q Do you have that chart? How is that labelled?

A El Paso Natural Gas Company Exhibit 3, estimated main line requirements versus main line design capacities, 1956, it says:.

Q Would you have that put on the wall there?

A Yes, sir.

Q We will go right on talking while they are putting it up on

the wall. What other sources, does the company have other than the San Juan?

A Well, they have the Permian Basin.

Q They have dry gas in Lea County and other sources in the Permian Basin?

A That is right.

Q Residue gas in Lea County, also?

A Yes, sir.

Q Is there connections so that gas from the South east is mingled with gas from the San Juan before it gets to its ultimate market?

A There is.

Q Will you look at the Exhibit No. 3, and tell the Commission what the total volume of August, 1953 was for the entire system? I believe this is shown in billion cubic feet, is it not?

A Yes.

Q So, that in August, 1953, approximately what were the main line actual requirements, the total main line requirements?

A A billion three hundred million.

Q By December of 1953, what was the actual requirements of the system?

A Well, it would be about a billion five hundred fifty million, six hundred million.

Q So, that in that three months period, there is a fluctuation of about 350 million cubic feet per day?

A That is right.

Q I believe that the chart also shows a dotted line,vertical line that indicates at that time what the main line design capacity

was slightly in excess of the actual load in December, 1953, is that right?

A That is true.

Q Then, by additional construction, the line, I believe is moved over as of the present time to approximately two billion, is that correct?

A That is true.

Q What is the average daily line requirement for December of 1954?

A December, 1954, it is two billion, well it is between two billion nine and two billion, it will be a billion nine six.

Q For January, 1956, what would the figure be?

A It is about two billion one.

Q For August, 1956, what is the estimate?

A That is a billion nine.

Q By December, 1956, what figure does it reach?

A It would be two million two, that is right.

Q Now, with relation to the difference between the average daily load requirements and the peak day load requirements, what was your actual peak day requirements in December of 1953?

A Billion five, billion six.

Q What is your peak day estimate by December of 1956?

A Two billion one.

Q So, that does this chart show the fluctuation which exist in the overall market, which the company's system serves?

A Over a time, yes, sir.

Q Do you have another chart prepared here, will you have someone put that up? It is marked El Paso Natural Gas Company's Exhibit

No. 4. Will you state what that chart reflects?

A This covers a shorter period of time. It is total main line sales and fuel from March 20, to April 11, 1954.

Q Does that show the actual volumes from day to day during those periods?

A It does.

Q And without calling each one out, does it show a fluctuation over the week end of March 20, and 21, when approximately a billion point 6 was the volume up to a peak day of a billion 8 fluctuation of two hundred million in less than a week there in the daily requirements?

A Yes.

Q A drop down by the 11th of April to about a billion--what is it?

A A billion two.

Q A billion two hundred million. Is that fluctuation from day to day and from week to week and month to month constant in the marketing of gas by El Paso Natural Gas Company?

A Yes, it is.

Q Now, do you have another chart that reflects the California demand?

A Yes, sir, I do.

Q Is that chart marked El Paso Natural Gas Company's Exhibit No. 5?

A It is marked No. 5, it doesn't have the El Paso Natural Gas Company on it.

Q What does the upper portion, the upper half of the chart from this parallel line to the top of the chart show?

A It shows Southern California takes.

Q What does the black line show?

A That shows the 1953 takes, the red line shows the 1954 takes, the rate changes.

Q By the rate changes, what do you mean by that?

A The orders that we get from time to time changing the rate of the gas we put through the pipeline.

Q In other words, in dispatching the gas, you get an order from the California Company saying they will want so much gas a certain time in advance. Each one of these figures represents a notice received from that company that the rate of delivery is to be changed?

A That is correct.

Q That shows the fluctuation in the deliveries to the Southern California market. Does the San Juan feed into the Southern California market?

A It does not.

Q Does the lower portion of that chart reflect the same data with reference to the Northern California market?

A It does.

Q Is the gas produced in the San Juan put into the line that serves Northern California and communities in between here and the California line?

A It does.

Q Now, does the black line show the 1953 actual takes?

A It does.

Q And does the red line show the 1954 actual takes?

A It does.

Q Are those abrupt drops, how much volume does that drop such as appears here in the map on the 10/or 11th day of the month?

A These are 25 million increments here. The 11th, that is 450 million and on the 10th, we worked, that was a total sales, not all out of the San Juan but total sales of 600, about 630 million.

Q Then, in one day it dropped to 450 million?

A That is correct.

Q Mr. Striklin, what happens when you get one of those drops in the way you have to operate up there in the San Juan?

A We take the swing and cut the gas back.

Q How do you actually do it? Do you go out and turn valves on any portion of the 700 wells?

A We sure do. However, it depends on the size of the order that we get. It is quite possible to, by cutting back compressor stations and raising the pressures on the plants to raise the pressure in the field there by cutting back the flow to some extent. However, on heavy cuts, we have to go to the field and cut them off.

Q What is the effect of cutting off compression and raising the pressures on the gathering lines?

A Well, it gives you a higher pressure at the well head and the gas won't flow into the gathering system.

Q Which wells are the ones that necessarily are affected when that happens?

A Well, they are all affected. However, the wells that produce the least gas would be affected the most, I suppose. They would have less flow into the pipeline. They are weaker.

Q Is it possible in marketing this gas out of the San Juan to operate a system in such a manner that a well can be allowed to pro-

duce the same amount of gas each day in the year?

A Oh, no, no, sir.

Q Do you have any charts which you have prepared with relations to the actual takes from the San Juan Field?

A Yes, sir, I do.

Q Is that both Mesaverde and Pictured Cliffs?

A Yes, sir, it is the total.

Q Is that marked Exhibit No. 6?

A Six, yes,sir.

Q Will you hold that up so we can see. I think there are several sheets.

A It runs by months from August, 1953 through May, 1954.

Q Let's start with August, 1953, just get Mr. Woodruff to hold it up. Let's use him for a board there. Just trace, if you will, thefluctuation in the actual takes of gas during that period?

A Well, all right now, this chart, the top is 330 million and it stops at 160 million on the base. You can probably get some idea as to the trend through here. You want me to name--

Q (Interrupting) Just pick out some of the figures there?

A All right, on the 1st day of August, we were handling 195 million;on the 14th day of August, we were handling 275 million. I am showing extremes here. On the 23rd, we were down to 180 million, consequently on the 24th, we came right back up to 200, about 240 million, so on.

Q Let's look at the next month. What is the next month?

A It is in sequence, it is September.

Q Just give the two extremes in the fluctuation, the lowest?

A It seems like the extreme high would be somewhere in the

neighborhood of 270 million, it is 295 million and the lowest was 90,million.

Q Now, for the next month, what is the fluctuation?

A Well, we get the extremes again, we go over to the latter part of the month of October. We are in October, that extreme there would be, oh, about the 24th or 25th. It was Sunday, about 200 million, on Monday, 310 million.

Q The next month?

A Well, there we get to the end of the month again, and that is November and that would be on the 29th, it is on Sunday and we are down to 100, about 175 million on Monday we are up to about 308 million.

Q What other months do you have?

A I have another month here in December and that is on the 19th, we went way down, That particular case, however, was due to some physical work that we were doing to the pipeline, normally in the winter months, it stays a little better than it does in the summer. January , 1954, we started out with 300 million and we ended up with 435 million, 400 and about 438 million maximum. This is February, on about the 12th of February, we were at 400 million a little under about 395 million, maximum 455 million.

Q Those that we have shown are they typical of the fluctuations that take place?

A They become more rapid in the summer time.

Q Let's go to the last one.

A It started out,oh, well, it goes all over the place, we are down here to 215 million and we are up to 415 million and it just jumped all over the place during that month. That was May, 1954

You want me to post this up here?

Q Yes. I believe you have an average figure that represents on peak of the pipeline capacity the additional amount you have to have for fuel in the compressor stations and shrinkage, one thing and another. Do you have a figure on that?

A Yes, sir. You are talking about the field fuel now?

Q Yes.

A Yes, sir, we have a figure on it.

Q Is that for use in the drilling out there in the field?

A Well some, that figure isn't, there is some drilling in with gas out there and we do use it, the figure that I had there that isn't included in that 22 million.

Q That is fuel that goes into compression?

A It goes into compression absorption losses and that sort of thing.

Q What does that figure run? A 22 million.

Q A day? A Yes, sir.

Q What is the capacity of the El Paso system, present system in the San Juan Basin?

A Well, we have got a certificate for 387 million.

Q That is delivery at California or point of delivery?

A Delivered out of the Basin.

Q In order to do that, you figure you have to take from the wells, approximately, 22 million more?

A That is right

Q I believe the question was asked as to the load factor which the system is designed, do you know what that is?

A Yes, we are designed to operate 91 percent.

Q 91 percent load factor? A Yes.

Q In the operations in the field when the peak demand comes on, where do you have to get the gas?

A From the San Juan Basin?

Q Yes.

A From the wells.

Q From any wells in particular as the peak demands go up?

A No, we get that after you have gone so far, you get what we have been doing as has been pointed out here in previous testimony, we have been flowing most wells on the line with the exception of the severe cut backs when we get high demands, we go and turn the wells on that we have off and put our compressor stations upto the designed capacity pull, and pull the gas out of the line.

Q If you have a well on the line that is making its deliverability, can you get any more gas out of it when you get to the periods of high demand?

A No.

Q If you have got a well that will deliver a hundred thousand cubic feet a day, why can you get much more than a hundred thousand cubic feet of gas out of that well?

A No, that is all you can get.

Q So, that the question I am getting to, Mr. Striklin is this, is it possible not from the company's operations, but from the viewpoint of the operators, of the small well that he can make up when he loses out on the production by reason of having his well shut in or by reason of having the line pressure backed up to where he can't deliver against it?

A As I understand it, the well is on, it is on its maximum,

it delivers that.

Q Yes.

A Then, for some reason it is shut in.

Q That is right.

A No, sir. There is no way in the world.

MR. HOWELL: That is all.

MR. SPURRIER: We will take a short recess.

(RECESS)

MR. SPURRIER: Mr. Howell.

MR. HOWELL: We would like to offer the Exhibits 1 through 6 and with reference to copies 1-A and 1-B we would like permission to withdraw them after the conclusion of the hearing long enough to make copies and then replace the copies.

MR. SPURRIER: Are there objections? Without objection they will be admitted and you may withdraw them for making copies.

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

MR. TURNER: Just one.

J. M. STRICKLIN

Cross Examination

Q Mr. Stricklin, would you state for the purpose of the record approximately how many miles of natural gas pipe lines are operated by El Paso Natural Gas Company?

A Well, it would be approximately in the neighborhood of eighty-five hundred miles.

Q Eighty-five hundred miles of pipe line?

A Yes, sir. (That is all.)

BY MR. GREINER:

Q I am not sure whether you covered this or not. Maybe I missed it. At what annual load factor did you say your system was operating, at the present time, or was designed to operate at?

A I said designed to operate at.

Q At which? A Ninety-one percent.

Q Designed to operate at ninety-one percent?

A Yes, sir.

Q Is that in fact what you are operating at at the present time?

A No, we are operating at about seventy-five percent.

Q Is that merely through the summer or taking the whole well, say the year starting from now, would that be your guess as to what it will be for the next year?

A No. I think that that load will pick up in the Fall.

Q So it will be somewhere between seventy-five and ninety-one in that range?

A Well, it would be possibly around ninety-one percent on the average. I couldn't say to that, of course.

MR. SPURRIER: Anyone else? If not, the witness may be excused. (Witness Excused)

MR. HOWELL: That is all we have.

MR. SPURRIER: The next company on the list is Southern Union, I believe.

A. M. WEIDERKEHR

Direct Examination

BY MR. GRENIER:

Q Will you state your name for the record?

A A. M. Weiderkehr.

Q You are employed by Southern Union Gas Company, Mr. Weiderkehr?

A That is correct.

Q In what capacity?

A Manager of the Exploration Department.

Q What is your professional background, if any?

A Well, I am a graduate of Texas A & I College. Graduated in Natural Gas Engineering. Also, with a B. S. in chemistry. After graduation I went to work for Magnolia Petroleum Company; worked two and half years in the field covering fields in Arkansas, Louisiana, East Texas, and South Texas; and two and half years in their Dallas office working as a reservoir engineer; and for the past two years I have been employed by Southern Union most of that time as Southern Union's reservoir engineer.

Q You have testified previously before this Commission?

A I have.

Q Have you ever turned any valves in the field, Mr. Weiderkehr?

A I have.

MR. GRENIER: Are his qualifications acceptable?

MR. SPURRIER: They are.

Q Mr. Weiderkehr, will you tell us, please, what Southern Union's interest at the present time is in the production of gas from the Blanco-Mesaverde Pool.

A Well, Southern Union is both a producer and a transporter of gas from the Blanco field.

Q Approximately how many net gas wells would the company's working interest in the pool amount to?

A Approximately fourty-three.

Q Are any of them subject to being bought away from the Company by anyone else?

A Half of them are subject to Aztec Oil and option by Aztec Oil and Gas Company.

Q Which would leave Southern Union with a working interest in twenty-one or twenty-two net wells?

A That is right.

Q Does the Company have any additional undeveloped lease holdings in the Mesaverde Pool as presently defined or in its immediate vicinity and believed capable of producing from the Mesaverde?

A Yes we do; in the vicinity of twenty-five thousand acres.

Q Is any of that under option to Aztec?

A Thirteen thousand acres of that is under option.

Q So about twelve thousand acres is left that we know we are going to have, in any event?

A Correct.

Q How many wells in Southern Union's pipeline system currently connected to in the Mesaverde Pool?

A I would say in the vicinity of one hundred thirty wells.

Q Is it purchasing directly from all of those wells?

A Southern Union or the Southern Union subsidiary connected to those wells.

Q And is it taking from all its own wells?

A Not necessarily, no.

Q The gas from some of the wells is being sold to El Paso, is that correct?

A That is correct.

Q As a producer, would Southern Union, in your opinion, be materially affected in relation to its total business by the imposition of any of the prorations formulas which have been described here during the past two or three days?

A Well, as a producer I think probably Southern Union has wells that are probably average in the field and I don't think it would make a whole lot of difference what type formula was set by the Commission. As a purchaser, of course, we realize that the more deliverability involved, the easier it is to operate. If proration is necessary, and we sort of think it is, it won't affect us a whole lot no matter which type formula that we have to go to since there is going to be work involved in any type of formula.

Q In other words, the opinions which you express as respects what would be a proper allowance formula between wells will not be materially influenced by the effect which they might have upon our company?

A I hope not.

Q Just why then is Southern Union interested in these proceedings, in taking a part in them, and proposing an allocation formula.

A As I stated, we are a producer, and the management of our company feels that we are connected to quite a number of wells from

independent producers who he thinks we need to protect. He is interested in protecting them as well as our own company. For that reason we are planning to take an active part in this hearning.

Q It is your idea then, that whatever formula is adopted in the field should be as fair as possible to every one?

A It is.

Q That is the primary basis upon which you are going to testify?

A Yes.

Q Have you made any studies of the Blanco-Mesaverde Pool to determine its characteristics in an effort to determine what might be a fair proration formula to apply there?

A I have.

Q Have you made any study in particular of deliverabilities as developed in the field by means of the recent or the last deliverability test?

A I have.

Q Have you any maps or anything of that sort to show for your efforts?

A Yes, I have one, the list of which the Commission has seen. I am going to put it on the board and discuss it very briefly, but it has a second purpose in that we have cross sections following. This map was prepared from information taken from the Commission's files, information supplied by El Paso Natural, and information collected by Southern Union in its own testing program, and we have shown, have a scale showing varing deliverabilities and a color scheme as the Commission has seen in other exhibits. I think it is

self-explanatory.

Q Do you observe from an examination of this map or from the other studies which you have made, any relationship between the deliverabilities there shown and the underlying reserves as indicated by the data which you have had available to you?

A I feel that in general, there is some trend between deliverabilities and reserve, but I do not feel that this trend is consistent throughout the field. I do not believe that variations in reserves vary with it directly, with the deliverability of the wells.

Q Have you, too, had an opportunity to examine any cores which have been taken from various wells in this field?

A A few.

Q What do those cores indicate to you respecting the consistency of porosity and permeability through the field?

A The few cores that I have seen have a general characteristic showing somewhat in the vicinity of nine to eleven percent average. There are varitions--

Q Average what?

A Nine to eleven percent variation in porosity. There are extreme cases, of course, where the porosity drops down to very small percentages and the porosity can increase in small intervals up to sixteen to twenty percent.

Q How about the permeability, have the cores that you have examined seemed fairly homogenous in their permeability?

A No.

Q Have you seen any evidences of fracturing in the cores that you have examined?

A I have.

Q Material or slight?

A Let me say that I am not a geologist, I do not intend to qualify to a geologist and I would prefer that you would leave that question alone.

Q Restate for us then if you will, to what you attribute the rather wide variation in deliverability as reflected in our color or code map and the two, three, previous similar maps which we have seen, the wide variation in off setting wells there.

A I believe, and again I say I have no conclusive proof, but I believe that this variation must be due to a system of fracturing.

Q Would completion methods have anything to do with it?

A They would but they would probably have little to do with wells which were completed, naturally, with high IP's.

Q But as between the wells which had been shot and had initially similar IP's variations after the shooting would probably be due to the shooting rather than to differences in reserves?

A Due to the results of the shooting, yes.

Q Or other stimulatory techniques?

A Right.

Q Have you worked up any additional exhibits in anticipation of this hearing, Mr. Weiderkehr?

A Yes, I have.

MR. GREINER: Mark this exhibit Number Two for Southern Union Gas Company. (Marked Southern Union's Gas Company Exhibit No. 2)

Q Will you generally describe this exhibit to us, please.

A Our Exhibit Number Two is a cross section starting in Section 2, 3, North and 12 West, and taking a general southeasterly trend across the heart of the field and down in the southern end of the field, and ends up here in Section 6, 26, 7. That is a cross section showing the electric and/or neutron logs on various wells in the field. I have shown at the top of this exhibit the company number, the well name, the location, and the deliverability which I obtained from sources heretofore mentioned for each of the individual wells. I have also, I believe on each well, shown the casing point on the individual wells.

Q Now I see a red line--excuse me.

A The scale on this, on the left hand side of the map is simply a sea level scale and shows the relationship of each individual well as far as sea level is concerned.

Q Now I see a red line on the map going up and down. What does that represent?

A The red line represents a graphical interpretation of the deliverabilities that are pointed up here and it is on there to show the fluctuation a little more easily.

Q Does there appear to be any consistent relationship there between sand thickness and deliverability?

A No. Apparently not. If I am permitted to look across the various sands that appear to be trending across the wells, I note that some wells of apparently the same general sand thickness have extremely wide variations. I also note that there are wells with thinner sand sections which do have lower deliverabilities and

which would seem to indicate that in some instances deliverability and reserve might tie together. I would aslo like to point out for the record at this time, that this particular well was completed only in the Point Lookout and had a deliverability of nine hundred twenty-nine thousand a day, against another well in the same general location completed somewhat higher with a deliverability of two hundred sixty-two MCF a day.

Q That is also higher on the ones on the right?

A To the extreme right showing, I believe, that reserve can not always be based on the deliverability of the wells.

Q Do you have an additional exhibit to show us at this time?

(Marked Southern Union Gas Company's Exhibit No. 3 Case No. 330, 330A, for identification)

A Yes.

Q Before we take up this exhibit, let's go back and clarify the record a little bit. You said that this well in referring to Exhibit Two had been completed in only a portion of the Mesaverde series. Which well was that that you were referring to?

A Southern Union Gas Company, No. 1, Patterson. Section 2, 31, North, and 12 West.

Q Which were the other wells that you referred to as being opened through the entire series and have a lower deliverability?

A The second well to which I referred was El Paso Natural Gas, No. 1, Heaton, located in 28, 31, 11, some five or six miles away; simply for explanatory purposes, but that they are closer together in 36, 28, 8, El Paso Natural, Blanco No. 1. Unit completed with the entire section open with the lower deliverability than the

Southern Union Gas Company, Patterson, No. 1.

Q Will you explain Exhibit Three to us, please?

A First let me refer to our Exhibit Number One which shows the location of the various wells shown on Exhibit Number Three. These wells are located in a nine section area, being sections 22 through 24, or 22 through 27, and 34 through 36, township 31 North and 9 West.

Q Why was that particular group of wells picked, Mr. Weiderkehr, for this exhibit?

A Because there is some variation in deliverability between wells and of such close proximity.

Q Tell us what Exhibit Three shows?

A Southern Union Exhibit Three shows the various wells pointed out, shows the neutron log of the individual wells which were considered from which I believe that we can pick generally the sand thicknesses showing that the sand across most of these wells are approximately equal. I have shown the deliverability where it was available or the IP's where it was available on each well, and the deliverability if it was available. Since I didn't have the information on all wells, I showed the maximum production for the year 1953 and the total production offset the number of wells that well has produced. This exhibit shows that offset, relatively offset wells produced monthly fourty-six million, seventy-three million, one hundred sixty-eight million, fifty million, sixteen million, thirty-two million, fourty-nine million, one hundred twenty-seven million, no production, these are thirty-four million, thirty-eight million,

and eight million.

Q What are the variances which you observed in deliverabilities on the wells which you have data in this group of wells?

A In this group of wells the lowest deliverability is four hundred twenty cubic feet, thousand cubic feet per day. The highest deliverability is nine million and fifteen thousand cubic feet per day.

Q In IP what variance do you find?

A IP's vary from 2240 MCF a day to 23,000 MCF a day or 23 million cubic feet.

Q Does this exhibit tend to confirm or weaken your previous statements as to the probably relationship between deliverabilities and reserves in this Pool?

A I think that this exhibit pretty definitely shows that there is in many instances, particularlly where a group of large wells exist, that there is no probable relationship between deliverability and reserve.

Q Do you have any other cross section of the field along similar lines?

A Not along similar lines.

Q Do you have any other cross sections of the field?

A I do.

(Marked Southern Union Gas Company's Exhibit No. 4.)

Q What does this exhibit, which has been marked as Southern Union Gas Company's No. 4 show Mr. Weiderkehr?

A Exhibit 4 is the line B prime originating in Section 5, 30

North and 10 West and going across 30 North ending up in Section 19, 30 North and 4 West. This is a cross section across the center of the basin, actually. On it I have shown the well name and the location, the operator, the IP if available, the deliverability and maximum months of production if available, and the 1953 production. I have also shown on all, with the exception of one well, the casing point. I have drawn a line across what I consider to be tje top of the first main sand below the Pictured Cliffs which may or may not be the Cliff House. I have also attempted to determine the bottom of the Mesaverde section. This line (indicating) I hope you will ignore it. The map was prepared for something else. It does show the structural relationship between the Pictured Cliff and Mesaverde series.

Q Does this Exhibit tend to show anything with respect to thickness of sand and relation to position and field?

A I think this map will pretty well prove that acreage as a location factor could not be fair.

Q That is acreage alone?

A Alone, since I would assume that each of these wells, all of them with the exception of these wells, which I believe are considered commercial wells and yet the pay section in these wells from which we determine reserves varies from approximately gross section approximately seven hundred fifty feet over to possibly one hundred fifty feet.

Q That is a gross sand section rather than a net pay?

A Gross sand section.

Q You have not attempted to evaluate on this exhibit net pay?

A I have not.

Q Have you made any studies, Mr. Weiderkehr, as to the length of time that it will take wells of average cost in the Mesaverde Pool to pay out at various rates of production?

A Yes, I have. Based on an 87½ percent value of gross production, assuming Mesaverde gas to be worth twelve cents, I have shown the pay-out time of wells which I assume cost eight thousand. This pay-out time is based on two hundred, fifty, three hundred, three hundred fifty, four hundred, four hundred fifty MCF per day.

Q What do those pay-out times indicate it to be?

A The pay-out time for a well producing two hundred thousand cubic feet of gas per day three hundred sixty five days out of the year is 10.43 years; the pay-out time decreases and at four hundred fifty thousand cubic feet per day the well would pay out in 4.64 years.

MR. GRENIER: A copy of this has been marked as "Southern Union Exhibit Five" for identification purposes.

Q Have you made any similar studies as to, or are you familiar with the length of pay out period which the commission used in its recent hearings and studies regarding a depth allowable factor for oil production in the state?

A Yes, I think that approximated one half years.

Q What would the rate of production have to be for a Mesaverde Pool well to pay out in one and half years?

A 087½ percent of gross production, that would be around four hundred feet, if I have it, of gas per day.

Q Four hundred seventy-five thousand feet of gas per day. Based upon your studies, have you attempted to draw any conclusions as to what might be a proper proration formula for the Mesaverde

Pool the Blanco-Mesaverde Pool?

A I have some ideas. It is my contention that none of us know what is true and fair in this particular field. I think that I have shown that deliverability alone is definitely not fair. Conversely, I think I have shown that acreage alone could not be fair.

Q Why do you express only those two factors, acreage and deliverability?

A Those are the two factors which most operators in this area have considered.

Q Do you feel that there should be any minimum allowable fixed for the field which a well would get in any event to the extent that it is able to make it?

A I think that in any allocation formula which the Commission might adopt, that we will need a minimum allowable. I would suggest to the Commission that a minimum allowable be set at approximately three hundred fifty thousand cubic feet of gas a day which would give a pay-out of approximately six years.

Q That compares with the eighteen months pay-out period which the Commission's staff used in considering the oil depth allowable factor, is that right?

A That is correct.

Q Would you classify that as a slow, swift, or medium pay-out?

A Extremely slow, but I think that is necessary due to the fact that we have large areas that are proven for gas production in the San Juan Basin. But, the deliverability of these wells is going to be such that unless they are given a chance to make at least that much gas, they, will never be drilled. I know the approximate cost of wells in the area and that varies from I would say fourty-five

to one hundred thirty thousand dollars per well and unless a company anticipated that they were going to be able to get that money back, I don't think that a large portion of the San Juan Basin would ever be drilled. Areas which we know from past history contains gas, it would not be commercial at some what lower rates.

Q So that by setting a minimum allowable, you feel that you will encourage a greater ultimate recover of reserves from the field?

A I feel that we will obtain a greater ultimate recovery, that we will drill and develop areas that might not other wise be developed and in such drilling will develop new methods of completion which will be beneficial to the area.

Q In your opinion, should there be any maximum allowable imposed upon wells which would be able to produce more than that if there is a delivery component in the formula?

A Yes, I think a maximum allowable would be necessary.

Q How much would you recommend that the maximum allowable be?

A At the present time and under present conditions with the market demand being considerably less than the availability of gas, I believe that a fair top allowable would be somewhere in the vicinity of two and half million cubic feet of gas per day.

Q Explain to us why you feel that that would be a fair maximum allowable.

A It is my contention that there is no well in this field that has in excess of twice the reserves of the average well.

Q That is not of the poorest well, that is of the average well?

A That is the average well. If deliverability enters into the formula, probably the average well will get an allowable of somewhere

near seven hundred or seven hundred fifty thousand cubic feet of gas per day. If we give an allowable, a maximum allowable of two and half million feet of gas per day, we have not only protected correlative rights, but we have given some justification for an operator to develop new techniques in order to complete larger wells. I think that if you put too low a maximum allowable that you would take away some of the initative to develop better techniques.

Q This then is about three times the anticipated average allowable for the field, based on our current knowledge of probable demand conditions there?

A That is correct.

Q As compared to the two to one ration, which you think is probably the broadest spread in actual reserves between best well average well?

A Correct.

Q Now then, between the range of our maximum allowable and your minimum allowable, what formula would you propose to have applied?

A I would recommend to the Commission that they use a formula of fifty percent acreage times deliverability plus fifty percent acreage.

Q What is the basis for that recommendation, Mr. Weiderkehr?

A Do I have to answer? I believe actually that from testimoney that has been presented here and from the studies that I have made that that type of formula will allow each tract, each well to produce its equitable share of the reserves underlying that individual tract.

Q You don't feel that that is an exact correlation between reserves and allowable?

A No, I do not.

Q But you do feel that it is a reasonable, fair approach in the light of all the circumstances of which you are aware?

A I feel that it is just about as good as we can do from the information we have now.

Q Mr. Weiderkehr, there was some reference in previous testimony to these six month balancing periods, and when they might commence and end. Do you have any ideas as to how these balancing periods should be arranged during the year from an operating standpoint?

A From Southern Union operating standpoint, it would be advisable if we were to be able to balance out our summer and winter load to have a portion of the winter fall in each of the two balancing periods. Southern Union supplies primarly a domestic market and our load factor varies from winter to summer extensively. If all the six month balancing period should happen to fall in the summer, one time in the winter for the other six months, we might have trouble balancing out so I would suggest that February 1st be the cut-off date.

Q In other words, the two balancing periods would begin on February 1 and August 1 of each year?

A That is correct.

Q What is the annual load factor of Southern Union, if you know?

A Approximately fifty-two percent.

Q That is materially lower than the ninety-one percent or seventy-five to ninety-one percent testified to by Mr. Stricklin a moment ago, is it not?

A Yes, it is.

Q So that this is a matter of considerably greater importance

in all likelihood to Southern Union than it would be to El Paso from an operating standpoint?

A I don't know that I would go so far. They have considerably greater volume, but we have a greater variation in load. I think that I would agree with El Paso that they do need a date different from the Lea County area, but I would request that it be set only a month or so different, rather than the time they requested since our two lines are not connected, and we are in dire need of a cut-off date in the San Juan Basin, that will allow us to split our summer and winter production.

Q I believe you stated earlier that Southern Union's operating problems, particularly as a pipe line purchaser would be considerably greater if the proration formula adopted were one other than one hundred percent deliverability, is that correct?

A That is correct. It's easier to operate on a flowing line.

Q Is Southern Union's management, to your knowledge, prepared to undergo these additional operating difficulties in the interest of fairness?

A Yes, they are.

Q In other words, your concern here has been to find and recommend to the Commission what you believe to be the fairest formula from the standpoint of all concerned rather than merely the one which would be the easiest to operate under from our company's standpoint?

A That is correct.

MR. GRENIER: That is all we have.

MR. SPURRIER: We will recess until 11 o'clock in the morning.

MR. GRENIER: I request that Southern Union Exhibits 1 through

through 5 be admitted.

MR. SPURRIER: Without objections they will be admitted.

MR. SELLINGER: I will be unable tomorrow to be present to make my concluding statement for the reason that I am a member of the eight-man coordinating committee to overhaul the October proration system which has to be presented to the Commission Monday and Tuesday of next week. I want to explain the reason why I will not be here tomorrow to make a concluding statement. It goes without saying that we recommend our acreage times pressure formula.

MR. SPURRIER: Can you submit a written statement or would you care to?

MR. SELLINGER: I will be glad to and I will be glad to furnish each of the proponents a copy of my written statement.

MR. SPURRIER: Are there others that would be willing to do the same in the interest of time?

MR. FOSTER: Yes.

MR. REEVES: I think the Pubco would like to take advantage of that offer. It os happens that I too have to leave town tomorrow.

MR. SPURRIER: Yes, and don't forget that the quick way to get, maybe you don't want a quick way, but the way to get an order in this particular case is to submit proposed rules along with your statement or at some time later.

MR. SELLINGER: We have already done so, but we will attach a copy of our proposed rule to our statement to each of the companies.

MR. SMITH: Will you set a time within which the written statement should be submitted?

MR. SPURRIER: I think we should. We will give you a time on that tomorrow. If there is nothing further, we will recess until

eleven tomorrow.

(Whereupon the hearing was recessed to 11:00 A. M. June 24, 1954.)

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

SPECIAL HEARING

CASE NO. 330- 330-A

TRANSCRIPT OF PROCEEDINGS

VOLUME IV

376 through 463

June 24, 1954

ADA DEARNLEY AND ASSOCIATES

COURT REPORTERS

ROOMS 105, 106, 107 EL CORTEZ BUILDING

TELEPHONE 7-9546

ALBUQUERQUE, NEW MEXICO

Morning Session

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

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

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

A. W. WEIDERKAEHR,

having been previously duly sworn, testified further as follows:

Cross Examination by Mr. Howell:

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

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

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

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

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

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

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

A That is correct.

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

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

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

A Yes, that is correct.

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

A That was its intent.

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

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

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

A I think that is correct.

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

A That is correct.

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

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

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

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

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

A That is right.

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

A Yes.

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

A That is correct, yes.

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

A That is one of the problems, yes.

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

A That is correct.

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

A Right.

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

A Yes.

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

A Yes.

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

A Yes.

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

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

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

A Yes.

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

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

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

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

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

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

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

A Yes.

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

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

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

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

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

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

MR. HOWELL: Yes.

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

MR. HOWELL: I counted thirteen.

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

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

MR. SPURRIER: You may.

MR. HOWELL: With the question.

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

A Correct.

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

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

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

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

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

A Yes, it does.

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

A Very definitely.

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

A I believe that is correct.

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

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

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

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

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

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

wells they are going to continue to grow weaker?

A That is right.

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

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

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

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

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

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

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

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

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

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

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

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

MR. SPURRIER: Anybody else have a question?

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

By MR. GORHAM:

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

MR. SPURRIER: What exhibit is that?

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

A That is correct.

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

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

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

A That is right.

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

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

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

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

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

A Over the entire field, yes.

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

A Yes.

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

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

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

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

sands from well to well?

A It would be impossible.

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

A That is correct.

Q That is correct? A Yes.

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

A To a certain extent, yes.

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

A Yes, I think so.

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

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

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

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

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

MR. GORHAM: That is all.

MR. SPURRIER: Anyone else? Mr. Smith.

By MR. SMITH:

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

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

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

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

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

A There is some relationship, yes.

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

A I do say so.

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

A It does.

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

A Well--

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

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

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

A No, but it does vary.

Q You also use pressure in determining deliverability?

A Yes.

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

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

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

A That is right.

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

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

Q There are other sized sections?

A There are some other sized sections.

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

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

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

A How much difference?

Q Differential.

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

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

A Stops at two and half million.

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

A I don't know what it would be.

Q You did know about the fifty-fifty?

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

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

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

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

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

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

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

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

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

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

MR. SMITH: Thank you very much.

MR. SPURRIER: Anyone else? Mr. Davis.

Quilliman Davis representing the Aztec Oil and Gas Company.

By MR. DAVIS:

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

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

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

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

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

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

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

A No.

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

A It is connected.

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

A I have.

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

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

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

A I surely do.

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

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

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

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

A There has been.

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

A That is correct.

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

A I do.

Q Why?

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

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

A That is right.

MR. DAVIS: Thank you.

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

By MR. REES-JONES:

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

A Right, I hope so.

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

A That is correct.

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

A That is correct.

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

A That is my opinion, yes.

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

A Yes.

Q I believe your minimum is three hundred fifty?

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

A Correct.

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

A There is, five hundred fifty-seven.

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

A Correct.

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

wells? A Yes.

Q Is that correct?

A That is my understanding.

Q So under--

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

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

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

A I believe that is correct.

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

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

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

A You brought up the people.

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

Weiderkehr?

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

Q What is the average?

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

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

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

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

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

Q In other words, we consider both?

A We consider--

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

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

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

A Right.

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

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

A I thought we were talking about gas wells?

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

A I would appreciate it if you would.

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

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

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

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

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

A We are having one formula.

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

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

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

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

twice.

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

A That is correct.

MR. REES-JONES: Thank you.

MR. SPURRIER: Anyone else? Mr. Smith.

By MR. SMITH:

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

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

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

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

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

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

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

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

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

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

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

A I have read it.

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

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

Q In other words, recoverable reserves?

A If they are the same.

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

A Then we should be prorating recoverable reserves.

MR. SMITH: Thank you.

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

MR. SPURRIER: Mr. Macey has some questions.

By MR. MACEY:

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

A Yes, sir.

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

A Most of them, yes.

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

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

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

A No, sir.

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

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

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

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

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

A Yes, I think so.

Q Don't you think that is wasteful?

A Yes, you are wasting energy and reserves.

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

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

MR. MACEY: That is all I have.

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

By MR. SMITH:

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

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

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

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

MR. SMITH: Thank you.

MR. SPURRIER: Anyone else? Mr. Griener.

By MR. GRENIER: Redirect Examination

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

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

A Yes.

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

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

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

A Yes, under the present operating conditions.

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

A That is correct, and total wells.

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

same?

A No, it would not.

Q Which way would it move?

A Down, under the assumption you made.

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

A That is correct.

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

A That is what it amounts to.

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

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

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

A Yes.

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

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

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

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

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

A Probably, but not necessarily.

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

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

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

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

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

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

A Not overwhelming, no.

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

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

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

A Oh, definitely.

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

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

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

A It could, yes.

MR. GRENIER: That is all

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

(Witness excused.)

Afternoon Session

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

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

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

MR. SPURRIER: How long will that be?

MR. GORDON: About a minute.

MR. SPURRIER: Let's here them.

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

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

The Albuquerque Associated Oil Company has requested me to

advise the Commission that they concur in this recommendation.

MR. SPURRIER: Mr. Jones.

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

R. G. CARLIN

having been first duly sworn, testified as follows:

By MR. REES-JONES:

Q Would you state your full name to the Commission?

A R. G. Carlin.

Q Where do you live, Mr. Carlin?

A Dallas, Texas.

Q By whom are you employed?

A Delhi Oil Corporation.

Q In what capacity?

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

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

A I do, and I have.

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

A That is right.

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

MR. SPURRIER: They are.

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

A At the present time Delhi Oil operates approximately fourty-

eight wells.

Q How many-- A Delhi?--

Q Go on.

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

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

A That, among others.

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

A That is correct.

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

A Yes.

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

A That is right.

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

A I have.

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

A Right.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. SPURRIER: Anyone else?

MR. WEIDERKEHR: Weiderkehr, for Southern Union.

By MR. WEIDERKEHR:

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

A I said in some cases.

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

A Very little.

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

A If it was presented I was here.

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

A No, I don't.

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

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

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

A That is in the Point Lookout.

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

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

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

A That is one of the factors.

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

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

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

A I think it is the combination of the feet.

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

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

Q Right.

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

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

A Those were recoverable reserves.

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

A Yes, sir.

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

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

Q Then there could be drainage between leases?

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

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

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

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

A I have no knowledge to the contrary.

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

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

Q Didn't you mention a straight line relationship?

A Yes, sir.

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

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

present such information that will substantiate it.

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

A That is our contention.

MR. WEIDERKEHR: Thank you.

MR. SPURRIER: Anyone else?

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

A That is some place between fifty and sixty degres.

MR. SPURRIER: The witness may be excused.

(Witness excused.)

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

E. C. ARNOLD,

having been first duly sworn, testified as follows:

Direct Examination

By MR. KITTS:

Q State your name, please?

A E. C. Arnold.

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

A That is correct.

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

A District Three office in Aztec, New Mexico.

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

A Yes, I have.

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

MR. SPURRIER: They are.

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

A Yes, I have.

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

A Yes, it was.

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

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

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

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

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

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

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

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

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

A Those indicate--

Q Go ahead.

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

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

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

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

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

A That is about correct.

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

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

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

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

Q The countour interval is what?

A Twenty feet.

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

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

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

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

A That is correct.

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

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

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

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

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

A The next variation which I have--

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

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

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

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

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

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

Q About 7-4.

A Which is approximately seven to four.

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

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

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

A I believe they are, yes.

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

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

Q The ratio?

A Within the same limit.

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

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

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

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

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

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

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

A I believe that is what I mean.

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

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

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

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

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

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

A No, I don't believe so.

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

A Yes, I did.

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

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

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

A That is correct.

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

A Yes.

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

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

MR. SPURRIER: Is there objection?

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

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

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

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

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

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

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

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

MR. KITTS: That is all for this witness.

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

Cross Examination

By MR. SMITH:

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

A No, that is the Cliffhouse.

Q In depicting your lines in here--

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

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

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

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

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

Q What was that value?

A That was approximately sixty percent on the gamma ray side

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

Q Why did you select those particular figures?

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

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

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

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

A To a certain extent.

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

A To a certain extent.

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

A That is exactly correct.

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

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

A Point Lookout.

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

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

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

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

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

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

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

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

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

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

A That is correct.

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

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

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

A I would say that it is probable.

Q You would say that it is probable?

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

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

A Between the high and the low?

A Yes.

A I believe I stated twenty to forty.

Q What is that differenial, two to one?

A Approximately eight to six.

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

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

A The sand thickness, that is correct.

MR. SMITH: That is all.

MR. SPURRIER: Anyone else?

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

By MR. GORHAM:

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

A That is correct, I believe.

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

A Yes, I am aware of that fact.

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

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

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

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

A Which ratio?

Q As the sixty percent line which you used.

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

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

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

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

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

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

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

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

A As compared to other areas?

Q That do not have that sand content?

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

MR. GOHARM: That is all.

MR. GRENIER: Grenier, with Southern Union.

By MR. GRENIER:

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

A I didn't understand the question.

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

A (Interrupting) I said--

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

MR. KITTS: Objecton.

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

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

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

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

A That is a fair statement.

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

A That is a fair statement;

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

A No, I do not.

MR. SPURRIER: Anyone else?

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

By MR. BARNES:

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

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

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

A That is correct.

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

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

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

A That is correct.

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

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

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

A Yes, in the past I have.

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

studies of it?

A I have also done that.

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

MR. BARNS: That is all.

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

(Witness Excused.)

MR. SPURRIER: We will take a short recess.

(Recess)

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

ELVIS A. UTZ,

having been first duly sworn, testified as follows:

By MR. KITTS: Direct Examination

Q State your name, please.

A Elvis A. Utz.

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

A Yes, I am.

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

A Yes, I have.

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

MR. SPURRIER: They are.

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

reservoirs, is that not among your duties?

A Yes, it is.

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

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

Q Those are Four and Five.

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

Q Four and Five.

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

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

A Yes, I have.

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

A Yes, I will.

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

you study, first of all?

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

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

Q What is the blue line, the blue curve?

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

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

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

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

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

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

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

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

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

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

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

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

A No, I believe that explains my analization.

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

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

of wells according to their ability to produce.

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

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

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

Q This was prepared by you, this exhibit?

A Yes, it was.

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

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

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

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

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

A Yes, I have.

Q Would you state what that exhibit shows or portrays?

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

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

A That is correct.

Q Is any other well shown?

A Yes, there are several of the wells shown.

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

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

on Exhibit Five.

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

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

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

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

MR. FOSTER: Which well?

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

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

A That is right.

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

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

Q That is one hundred thirty feet?

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

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

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

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

Q Proceed.

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

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

A Yes, it was.

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

A That is correct.

Q Proceed. Explain that exhibit, if you will.

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

Q Meaning those seven off-sets?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A Yes, I have.

Q Would you explain those exhibits to the Commission.

A Exhibit Eight is a map showing contours of equal deliverability

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

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

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

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

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

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

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

A Yes, it was.

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

A No, I don't believe I do.

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

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

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

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

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

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

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

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

A No, I believe I have had my say.

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

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

CROSS EXAMINATION

By MR. HOWELL:

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

A Yes, I am.

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

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

A Your production curve would possible indicate that, yes.

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

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

MR. FOSTER: What exhibit are you referring to?

A Three.

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

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

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

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

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

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

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

A That is right.

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

A Not that I know of, no.

MR. HOWELL: That is all.

MR. SPURRIER: Mr. Smith.

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

MR. SPURRIER: Thank you. Mr. Gorham.

By MR. GORHAM:

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

A Which other exhibit are you referring to?

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

A I wish you would, please.

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

A That is correct.

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

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

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

A Well Number "X"?

Q Yes.

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

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

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

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

A May I see Phillips Exhibit No. Four?

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

A Well--

MR. HOWELL: You are looking at different exhibits.

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

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

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

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

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

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

main sand body.

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

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

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

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

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

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

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

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

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

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

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

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

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

Q That is the question.

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

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

be entitled to that higher percentage of market?

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

Q Thank you.

A I don't agree they do however.

MR. HOWELL: That is all.

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

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

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

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

MR. BARNES: That is all.

MR. SPURRIER: Mr. Maxwell.

By MR. MAXWELL:

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

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

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

A May I see Phillips Exhibit No. Four?

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

hundred forty million?

A Well--

MR. HOWELL: You are looking at different exhibits.

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

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

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

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

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

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

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

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

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

Q I am at considerable variance with that but--

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

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

MR. SPURRIER: Is that a question?

A It is an exceptional--

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

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

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

A For the amount of gas produced? Q Yes.

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

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

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

Q 1953?

A 1953, yes.

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

A That is right.

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

A Yes, I do.

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

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

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

A I agree with that.

Q It is strictly a hypothetical curve you have there?

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

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

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

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

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

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

MR. SPURRIER: August or October?

A August.

Q What was the average pressure for the seven wells?

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

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

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

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

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

Q We are talking about recoverable reserves again.

A What length of time?

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

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

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

A For the pressure drop per pound.

Q Yes.

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

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

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

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

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

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

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

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

fracturing system.

Q To a certain extent.

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

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

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

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

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

(Recess)

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

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

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

A I--Yes, sir.

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

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

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

MR. MAXWELL: I believe that concludes my remarks.

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

MR. KITTS: That is right.

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

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

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

MR. SPURRIER: Anyone else? Mr. Barnes.

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

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

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

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

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

Ada Dearnley
Notary Public, Court Reporter

My Commission Expires:

June 19, 1955

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO 330-330A Special Hearing

VOLUME I

1 through 129

June 21, 1954

TRANSCRIPT OF PROCEEDINGS

OFFICIAL RECORD
OIL CONSERVATION COMMISSION

ADA DEARNLEY AND ASSOCIATES
COURT REPORTERS
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I N D E X

VOLUME NO. I

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R E G I S T E R (Continued)

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REGISTER

SPECIAL HEARING JUNE 21,1954, N.M. OIL CONSERVATION COMMISSION

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Frank D. Gorham, Jr.	Pubco Dev. Inc.	Albuquerque, N.M.
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N. E. Maxwell	Pubco	Aztec, N.M.
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R. S. Dewey	Humble Oil & Refining Co.	Midland, Texas
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ADA DEARNLEY & ASSOCIATES
STENOTYPE REPORTERS
ROOM 105-106-107 EL CORTEZ BLDG.
PHONES 7-9545 AND 5-9546
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

June 21, 1954

IN THE MATTER OF:

(Consolidated with Case 330-A) The first case is derived from Stanolind Oil and Gas Company's application for the amendment of Order R-110 relating to the Blanco-Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico.

CASE 330-A is concerned with the application of the Commission upon its own motion to consider an order promulgating rules and regulations for the Blanco-Mesaverde Gas Pool; Matters to be considered include gas pool delineation and definition, gas proration, gas well spacing, gas proration units, and related matters.

Case No. 330 & 330-A

BEFORE: Edwin L. Mechem, Governor
E. S. Walker, Commissioner of Public Lands
R. R. Spurrier, O.C.C. Secretary and Executive Director

TRANSCRIPT OF PROCEEDINGS

MR. SPURRIER: The meeting will come to order, please. The first case on the docket this morning is Case 330 which you will note is consolidated with Case 330-A. Stanolind is the applicant. I presume they will testify first.

MR. SMITH: May it please the Commission, we have already put into the record all the testimony that we care to put in at this particular time. We have already stated our position and we would like to reaffirm it in so far as the proration rules are concerned. It appears now that prorationing is in order as we anticipated when we first filed our application. Under the circumstances, we are prepared now to stand back and let some of the other operators and purchasers in the field take up the proceedings.

MR. SPURRIER: I have got a list. I would like to know--

MR. KELLAHIN: (Interrupting) At this time, Hancock does not desire to put on any testimony.

MR. SPURRIER: We have Pubco, Mr. Kelleher.

MR. KELLEHER:: Would it be possible, in view of the fact, in view of the fact that Phillips, they have the opposite side of it, to put Phillips on next and follow immediately?

MR. SPURRIER: I think it would be possible.

MR. FOSTER: I don't know whether it is or not. I think that some of these other proponents of this matter would do very well to lead off first. I don't know why it should all be reserved for rebuttal.

MR. SELINGER: Mr. Spurrier, we will be willing to start off the ball.

MR. SPURRIER: Thank you, George.

J. D. C O O P E R

the witness, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By: MR. SELINGER:

Q State your name? A J. D. Cooper.

Q You are associated with what company?

A Skelly Oil Company.

Q In what capacity?

A As a petroleum engineer.

Q Mr. Cooper, have you heretofore testified before the New Mexico Oil Conservation Commission as an engineer?

A I have.

Q Are you familiar with the Blanco Field, particularly the Mesaverde Reservoir?

A I am familiar with it to the extent that I have made a study regarding allowables under different formulas.

Q You have made an investigation of the factors with respect to this field and this pool in preparation for this hearing?

A That is correct.

Q You have also had a number of exhibits made under your supervision?

A That is correct.

Q Are you familiar with the Skelly Oil Company's interest in this field in so far as the records are concerned?

A Do you mean the land that we own?

Q The wells and lands, yes, sir.

A As to the wells that we now have or have an interest in, yes. As to the undrilled acreage only generally or vaguely.

MR. SELINGER: Are there any further qualifying questions of this witness from anybody?

MR. SPURRIER: Proceed.

Q Mr. Cooper, I will direct your attention to Skelly Exhibit 1, which is the left hand map of the three maps on the wall. Will you explain to the Commission what that map is and the coloring?

A When we began to gather information to make a study of the allowable formulas, we went to the Commission's files and gathered what data we could obtain there. On 355 wells we gathered information as to deliverability and this yellow color indicates the 355 wells in the Blanco-Mesaverde Pool.

Q There are in excess of 700 wells, however, in the field?

A That is correct.

Q At the time that you were working on this matter, the Com-

mission's records indicated the information on approximately 355 wells? A That is right.

Q You not only assembled the deliverability figures but also the pressure figures, is that correct?

A We took from the records the shut-in pressure which was determined at the same time the deliverability test was taken.

Q Also on Exhibit 1, Skelly Exhibit 1, there is an outline in black or blue. What is that area outlined?

A That outlines the limits of the Blanco-Mesaverde Field.

Q There are pencil figures which the Commission may not be able to see along side of each of the wells indicated on the yellow area. What are those pencilled figures?

A The upper figure is the shut-in well head pressure. The lower figure is the well deliverability as reported to the Commission.

Q You obtained that information from the Conservation Commission's records?

A That is correct.

Q Directing your attention to Skelly Exhibit 2, which is the middle map on the wall, will you indicate to the Commission what that shows?

A Well, it shows the distribution of the well deliverability with a color code. We split the deliverability range into six colors and colored the half section enclosing the well in the color corresponding to its deliverability.

Q The explanation of that, that doesn't necessarily indicate the 320 acre unit assigned to that well, but indicates 320 acres to each well on a density basis?

A It indicates the south half of the section to each well is

what we colored for.

Q It may be that the 320 acres may run north and south rather than east and west but you have followed a general practice of using the south half and north half of each section?

A That is right.

Q But at any rate, it is on the basis of 320 acres to each well? A Yes.

Q The low is indicated in yellow?

A The low is in yellow, that ranges from 0 to 100 MCF per day. The pink is from 101 to 300 MCF, the blue from 300 to 700, the red from 700 to 1000, the gray from 1000 to 5000, and the green is over 5000.

Q From the looks of that Exhibit 2, is there any apparent correlation between the deliverability and the location of the wells in the field?

A Apparently not. There is a general grouping of the extremely high deliverability wells in the area of Sections, Townships 30, 31 North, Range 9 West. Also there is one sticking out of here like a sore thumb, however, if you look at the offset wells to these high deliverabilities, for example, in Township 30 North, 9 West in the North East Quarter of Section 21, there is a well with a deliverability of 17,840 MCF per day.

Q Point that well out on the map.

A That is this well here.

Q Is that the highest deliverability?

A That is the highest.

Q Of the 355 so far?

A Of the 355. The five wells surrounding that well have de-

liverabilities as follows: in the South West quarter of Section 21, 454 MCF per day; in the North East Quarter of 20, 1,208 MCF per day; in the South West quarter of 22, 2,860 MCF per day; in the South West quarter of 15, 2,925 and in the South West quarter of 16, 418 MCF per day. There is a ratio there of maximum to minimum of 42.7 to 1.

Q In other words, the maximum of that well in Section 21 of 17,840 cubic feet as compared to a low in Section 16 of 418 cubic feet is 42.7?

A That is correct. That follows not only for the extremely high wells as an example in 31 North and 10 West in Section 22, in Section 21, I beg your pardon, but Section 22 is a well that,we have it circled. In Section 22, in the South West quarter the deliverability there 986. The diagonal South West offset which isthe North West quarter of it has 425. The diagonal South East has a deliverability of 180, the direct East offset in Section 23 has a deliverability of 1,043 and the other well in the same Section in the North East quarter of 22 has a deliverability of 1,982.

Q Is that deliverability or pressure?

A That is deliverability. In Section 21 of the South West quarter, of the well has a deliverability of 4,749, there is a range from 47 to 4,749 in this cycle of wells.

Q So, that the range of the well in Section 21 of 4,749,000 cubic feet of gas as compared to the well in Section 27 of 180,000 cubic feet is a ratio of approximately 26 and a half times?

A That is right.

Q Is that correct? A Yes, that is correct.

Q Will you look at Skelly Exhibit 3 which is the map on the extreme right of the three maps on the wall. Will you indicate to

the Commission whatthat map is?

A It is a color code on surface shut-in pressure. The pressures began at 500 pounds and extended through the 1,100 pound range and they are coded in 100 pound increments. The Exhibit is not completely for pressure contours,there are too many wells in between there and about all it shows,othe orange color is the average field pressure and it shows a distribution throughout the field that there is a fairly, at least uniform pressure. There are some anomalies but it is fairly uniform.

Q The orange color on that map, does that indicate the average pressure?

A We averaged the pressure of the 355 wells and came out 967. That is an arithmetic average pressure and that orange rangesfrom 900 to 1,000 pounds so the average pressure falls in the orange zone.

Q Are these three Exhibits among the Exhibits that you have had made up under your supervision? A Yes.

Q It is based on the information secured from the Oil Conservation Commission records?

A That is right.

MR. SELINGER: We would like to offer into evidence the Skelly Exhibits 1, 2, and 3.

MR. SPURRIER: Without objections they will be admitted.

Q Now, Mr. Cooper, have you had occasion to make additional Exhibits indicating the exhaustive nature of your study?

A Yes, I have made other exhibits.

(Marked Skelly's Exhibits 3, through 8, for identification.)

MR. SELINGER: I might explain to the Commission at this point, the position of Skelly Oil Company, so they may be able to follow

the testimony and Exhibits more closely than if they were in the dark as to what our position was. We have always adhered to the time honored policy of this Commission since the establishment of proration in 1953, of utilizing formula of 100 percent acreage in both the oil and gas proration. We are still agreeable and acceptable to continuation of such a formula. However, we feel that if the Commission deviates from 100 percent acreage in gas allocation that our recommendation for a formula is 100 percent acreage times pressure, and for that reason, we want to make that explanation now and all our subsequent Exhibits will go toward that view.

Q Mr. Cooper, I will call your attention to Skelly's Exhibit 4. Was that Exhibit made under your supervision?

A It was.

Q Where was the information that is indicated on that Exhibit taken from?

A The information used in the calculation was taken from the Oil Conservation Commission's records.

MR. SPURRIER: When?

A At the time of the last hearing on this matter.

MR. SELINGER: It was taken in or about the middle of May, on or about May 16th.

Q What does that Exhibit show with respect to the information indicated on that which you have secured from the Oil Conservation Commission records?

A This Exhibit is a tabulation of the 355 wells. We tabulated them by Section, Township and Range because that was the way the information was tabulated in the files. The columns across the page are Township and Range Sections, quarter sections where the well

is located, the operator, the well number, the lease, and the well capacity. We took, to determine well capacity, production history for 1953 where it was available on these wells. We also took the deliverability. We multiplied the deliverability by 30 and where that was larger than any production, any one month's production from the well in 1953, we used 30 times deliverability as the well capacity. Where the previous history of the well in 1953 indicated it could produce in excess of what the deliverability/test gave it, we used the past producing history. We have indicated by an asterick those wells in which deliverability was the controlling factor in determining capacity.

Q Those wells that don't show that asterick, you used the previous production history, is that correct?

A Previous production history, that is correct. In a few cases we had no history for 1953, so we went into the records and used 1954.

Q They are in rare instances three or four at the most?

A Three or four at the most, rare instances.

Q What does the next column show?

A The next three columns are a group, a calculation of the allowable based on a 75 percent deliverability times acreage plus 25 percent acreage formula. The first column is the deliverability of the well as was taken from the Commission's records. The middle column is headed Theoretical Allowable, by that we mean the allowable of that well if all the wells could make their allowable.

Q That is the allowable under the allocation formula of 75-25?

A That is correct. We then calculated an adjusted allowable by determining which wells had a capacity less than their theoretical

allowable subtracting that amount from the total nomination and re-allocating the remaining nomination. We followed that process , repeated that process until all wells would make their allowable. Those which we designated as limited wells, wells whose allowable was greater than their capacity are marked with a cross hatch.

Q So, that your theoretical allowable is the allowable for each and every well under the formula, regardless of whether they were able to make it or not?

A That is correct.

Q You adjusted it downward in the actual practice of proration of giving the limited wells their capacity and prorating the balance to the proratable wells?

A That is correct.

Q That is the allocation under that formula for all 355 wells?

A Yes.

Q You have similarly followed that process in the 5-50,a five percent acreage times deliverabilities times 50 percent acreage formula and also the formula which you have recommended, 100 percent acreage times pressure?

A That is correct.

Q You have done that under both allocation formulas for all 355 wells?

A For all three allocation formulas in all 355 wells.

Q Mr. Cooper, I will call your attention to what has been designated as Skelly's Exhibit 5 and ask whether or not you had that Exhibit made under your supervision?

A Yes, sir.

Q Where was that information secured?

A This information was secured the same place as the rest of the information we have presented, from the Commission files.

Q At the time your computations were made on or about the 16th day of May?

A At the time they began, which was on or about the 16th day of May.

Q What does that Exhibit disclose?

A It discloses the same information as Exhibit 4 except we have removed the column showing deliverability and shut-in pressure and theoretical allowable. It is a straight comparison of adjusted allowables under the three formulas.

Q It is an allowable for each of the 355 wells under the 75, 25, 62,50, 50, and your recommended plan of acreage times pressure?

A That is correct.

Q It compares the allowables of all the wells under each of those three plans?

A Yes. The same symbols, well capacity is on there and the same symbol is used to indicate a capacity defined by deliverability and the cross hatch is used to indicate limited wells.

Q Now, Mr. Cooper, have you determined the minimum allowable and the maximum allowable for prorated wells under each plan?

A Yes.

Q Calling your attention and referring you entirely now to the 75 - 25, the first formula under the Exhibit, what is the minimum allowable for a prorated well under that plan?

A I think first, we should explain that this Exhibit is based on a total allowable of 6,860,000 MCF per month. That is 6,860,000 MCF per month.

Q Or 6,860,000,000.

A (Continuing) We arrived at that figure by taking the sum of the average production of each well for 1953 and adding all those up and that is the figure that we got.

Q That is the field production and allowable and nominations that you/based secured, on actual production during the year, 1953, with the exception of the three or four instances where you had to use the 1954 figures?

A That is correct. We took the average well production for 1953 per month.

Q On that basis, what is the minimum allowable for proratable well under that first formula of 75,- 25?

A The minimum allowable is 6,983 MCF per month or 233 MCF per day.

Q Under that basis what is the maximum allowable for proratable well under that first plan of 75,- 25?

A 233,878 MCF per month or 7,796 MCF per day. This is a maximum to minimum ratio of 33.3 to 1.

Q In other words, that first formula of 75,-25 the maximum well would get over 30 percent, 30 times more than the allowable of the minimum well?

A On the proratable wells, yes.

Q On a proratable well? A Yes.

Q What is the minimum allowable for a proratable well under the last plan indicated on the Exhibit which is the 50,- 50?

A The minimum allowable under the 50 D x A plus 50 A is 13,996 MCF per month or 466.5 MCF per day.

Q That is approximately 466,000 cubic feet a day?

A That is right.

Q On that basis, what is the maximum allowable for a proratable well under that formula?

A 155,094 MCF per month or 5,169.4 MCF per day. That is a maximum to minimum ratio of 11.1 to 1.

Q What is the minimum allowable for a proratable well under the allocation formula that you are recommending to this Commission, of pressure times acreage?

A 16,700 MCF per month or 556.7 MCF per day.

Q That is approximately 556,000 cubic feet of gas a day?

A That is right.

Q What is the maximum allowance for a prorated well under your recommended plan for pressure times acreage?

A 30,721 MCF per month or 1,024 MCF per day.

Q What is that a variation from?

A This is a maximum to minimum of 1.84 to 1.

Q Under your allocation formula, the difference between the highest allowable well and the lowest allowable well is less than two times?

A For proratable wells?

Q For proratable wells. It was in excess of 30 times under the 75,-25 and in excess of 11 times under the 50,-50?

A That is correct. Incidentally, this total nomination is equivalent to 644 MCF per day per well if all wells had the same allowable.

Q Under the one hundred percent acreage?

A Yes.

Q Based on 320 acres? A Yes, sir.

Q Having studied these three plans as evidenced by your Exhibits 4 and 5, will you relate to the Commission your reasons why you favor an allocation formula of pressure times acreage as compared to the other two?

A As a prelude, I would like to explain that pressure, by pressure times acreage, I intend to mean bottom hole pressure times acreage. To me an allocation formula should be based as nearly as possible upon the relative reserve between wells. Decline curve extrapolation to bottom hole pressure versus cumulative production is generally accepted as a very accurate method of determining gas reserve. I feel that this principle can be applied between wells in the same field in a proration formula and that such a formula will be more directly related to individual wells gas reserve than either of the two deliverability formulas. As an example, if two wells started with equal bottom hole pressures but unequal reserve they will receive the same allowable on the first proration schedule, However, assuming both wells produce this allowable, the well with the smaller reserve will have a greater pressure decline and will consequently receive a relatively smaller allowable for the proration period following the next pressure survey. This adjustment will be continuous between all the wells in the field throughout the life of the field.

Q Mr. Cooper, you have secured the results of the deliverability tests from information garnered from the Commission's records, will you indicate to the Commission what range of deliverabilities you found?

A We found deliverabilities reported from 32 MCF per day to 17,840 MCF per day, a ratio of 557 to 1.

Q In other words, the ratio of the highest to the lowest, which is approximately 550 times?

A Yes.

Q In your opinion, as an engineer is the reserve variations between these wells as great as indicated by the range, such range in deliverability?

A Well, it is entirely possible for such a variation to occur. Especially since we have edge wells in any field and the reserve ratio between edge wells and fat field wells could easily be as great as a 557 to 1. However, under those conditions I don't believe the edge well would be a proratable well, it would be more likely to be a limited well.

Q You mean under any of the plans, it would most likely be a minimum well?

A Yes. Further on the same point, if you refer back to Exhibit 2, in the examples which we set out there in Section 15, 16, 20, 21, 22, Township 30 N, Range 9 West, this was a range of deliverability between offset wells of 42 to 1. It is my opinion that the difference in reserve between these offset wells will not approach 42.

Q Do you find similar instances in the field?

A There are instances, all you have to do is look for them.

Q Mr. Cooper, do you, of your own knowledge know of other fields, other gas fields that are prorated under the acreage times pressure?

A Yes, sir.

Q Mr. Cooper, I will hand you what has been marked as Skelly's Exhibit 6 and ask you to state what that is?

A Exhibit 6 is a tabulation of every 10th well on Exhibit 4

and 5, a total of 36 wells, since we began with the first well, it shows the effect of different nominations on the allowable under the recommended pressure times acreage plan.

Q In other words, you have taken the wells in Exhibits 4 and 5 and taken every 10th well?

A Yes.

Q Starting with the first well, No. 1?

A That is correct.

Q The red line on the Exhibit indicates the demarcation between prorated wells and limited wells, the wells above the red line are limited, the wells below are prorated?

A The first column,to make this calculation, I assume this was a 36 well field with pressures on the wells as indicated. The first column is based on the total nominations of 270,000 MCF per month or 250 MCF per well per day. The second column is 540 MCF per month or 500,000 MCF per well per day. The third is 810,000 or 750 MCF per well per day and the fourth is the well capacity as we determined it on Exhibit 4 and 5.

You will note from the way the nominations increased the number of wells which are limited, increases in like manner. Until you reach the ultimate capacity of the field and you, in effect, have no proration. We think that with this type formula, no minimum allowable or maximum allowable would be necessary. In fact, that a limitation such as that would probably be undesirable because on a reduced market the maximum number of wells bear the brunt of proration and this is as it should be.

Conversely, with the increasing market, increasing as it does across this Exhibit, only those wells with better and then greater

and then exceptional producing ability are prorated until the field capacity is reached and there is no proration.

Q Under this Exhibit, the way the plan works of acreage times pressure on a restricted market, more wells participate in bearing the brunt of the limited market?

A That is correct.

Q And as you have an expanding market, only the better wells gradually are prorated and gradually more and more of the medium size wells are dropped from proration?

A That is correct. This is possibly further better illustrated on the next Exhibit.

Q Exhibit 7?

MR. SPURRIER: Can we take a short break?

MR. SELINGER: Yes, sir.

(RECESS)

MR. SPURRIER: Mr. Selinger.

Q Mr. Cooper, referring to Skelly's Exhibit No. 6, that is the allowables under the various market demands as you have indicated under the recommended formula of acreage times pressure, is that correct?

A That is correct.

Q Again referring back to Exhibits 4 and 5, with respect to the pressure information indicated on there, will you please tell the Commission where that information was secured?

A The pressure information on those Exhibits was taken from the Commission's records at the same time we obtained the deliverability information and that pressure represents the shut-in in casinghead pressure or shut-in well head pressure taken at the close of the

deliverability test.

Q As required now by the existing rules of the Commission?

A That is right.

Q Now, you were going to refer to Skelly's Exhibit 7, which is now on the wall, will you further explain that Exhibit?

A Exhibit 7 is based on a hypothetical 20 well field with assumed equal bottom hole pressures and equal acreage per well and well capacity as shown on the Exhibit. This curve was drawn to demonstrate changing of nomination on individual well allowable.

Q Will you explain the side and the bottom so that we can follow it?

A Along the vertical scale of the Exhibit, the well allowable is plotted and along the base of the Exhibit, the total nomination.

Q That is the total allowable for the field?

A For the field, that is correct. Now, reading the Exhibit across, you notice, no nominations up to a nomination of 100,000 MCF a month and this is per month, all the wells are prorated at 5,000 MCF per month.

Q All the wells in the field of 355 wells--

A (Interrupting) No, all the 20 wells.

Q That you have used?

A Are prorated. As the nominations increased from 100,000 to 400,000, we drop from proration 9 wells and 11 wells remain prorated. Those wells have an allowable of 26,455 MCF a month, all the same allowable, the other wells have greater capacity. As the nomination then increases to 800,000 MCF per month, only the wells with the capacity in excess of the allowable as shown here which is 94,000 MCF per month are prorated, that is 4 wells prorated and 16 limited. When you reach the end, none of the wells are prorated, and 16 limited. When you reach the end, none of the wells are prorated,

that is the field capacity. We feel that by looking at this Exhibit, you can see that as the nominations increase the wells, the smaller capacity wells become limited. They are entitled to this allowable and they are given an opportunity to make that allowable. It is only until they fail to make it then the allowable is prorated among the wells who have additional capacity.

Q Under that formula then, the market demand for the field is taken care of if some of the wells fail to make their assigned allowable, the balance is thrown back into the proratable wells?

A That is right. This curve, if you look at the decreasing nomination, that as the nominations in the field fall, more and more wells, the poorer class of wells come under proration so that in a time of very low nominations, the greatest number of wells would be prorated or all the wells would be bearing the brunt of proration.

Q Then, in an unusual restricted or hard ship time, more wells participate in bearing the brunt of the restricted market, is that correct?

A That is correct.

Q And conversely in a more favorable expanding market, why more and more wells are permitted to capacity and the better wells are solely prorated?

A That is correct.

Q Under this formula then, all the wells are given an opportunity to produce their share of the gas, is that correct?

A All the wells are given an opportunity to produce their share of the gas market based on the relative reserve.

Q Mr. Cooper, I asked you before whether or not you had any

experience with respect to a formula which you have recommended to this Commission for proration of gas in the Blanco-Mesaverde Field in San Juan County in the event the Commission deviates from the 100 percent acreage. You stated that you did. I call your attention to what has been marked as Skelly's Exhibit No. 8. Does that indicate the allocation formulas of a great many, if not all of the gas fields in the State of Texas?

A Of the gas fields carried on the non-associated gas schedules.

Q Will you explain that Exhibit to the Commission with respect to the number of gas fields that are prorated under the various plans using whatever factors are applicable?

A Page 3 of the Exhibit is a summary of the formulas used in Texas. I have divided this into formulas, which are formulas that use only acreage and well factors and of the 125 total gas fields 44 use either straight acreage or acreage and well. In a field where all units are the same size or essentially the same size that amounts to a straight acreage formula. In the state of Texas, there are 45 gas fields using acres times bottom hole pressure as the proration formula. There are two gas fields which use one half acres time bottom hole pressure plus one half well. There are six fields which use two-thirds acres times bottom hole pressure plus one-third well. There are four fields which use one-third bottom hole pressure and two-thirds acres. A total of 57 fields which utilize either acres times pressure or acres time pressure to some extent modified by well.

There are also four fields which use acres time rock pressure or shut-in surface pressure and three fields which use two-thirds acres times rock pressure and one-third well. Seven fields, if you

add the two pressures together, that is a total of 64 fields. There are 8 fields using potential in the deliverability formula. Two use one half potential and one half acres. One uses one-fourth potential and three-fourths acres times rock pressure. Four fields use one-third potential and two-thirds acres times rock pressure. One field one quarter potential, one-half acres and one quarter well. There are six fields which have deliverability in their formula. There are two fields which use state acres time deliverability. Two fields which use one-half deliverability and one-half acres times rock pressure. One field one-third deliverability, two-thirds acres times bottom hole pressure and one field with one fourth deliverability, one-half acres times rock pressure, and one-fourth per well. There are also three fields which use acre feet in their formulas.

The comparison there is acres times bottom hole pressure of 45 fields, and acres times bottom hole pressure in a total of 64 fields which is compared with six fields which use deliverability.

Q So, you have a total of 125 fields that you have looked as to its allocation formula, just to the State of Texas, at least half use the pressure factor? A Yes.

Q And only six fields use deliverability in a portion of the factor, either from 100 percent on down?

A That is correct. As a further insight, of course, the one field which comes to everybody's mind in Texas which uses acreage times deliverability is Texas Hugoton. The comparable field in Texas which uses acres times bottom hole pressure is Carthage. We are the largest operator in the Carthage field.

Q We are the operator of the largest number of oil and gas wells in the field?

A That is right. To give you some idea of the relative size of these fields, I obtained production from March, 1954 from the Carthage Field from an Oklahoma Hugoton and Kansas Hugoton and I took the allowable from Texas Hugoton because I couldn't get the production. The Texas Hugoton had an allowable of 15,754,640 MCF, The Carthage produced 29,802,335 MCF, that is almost twice as much as Texas Hugoton. The comparison between Carthage and Oklahoma Hugoton is 1.66 times, it is 80 percent as large as Kansas Hugoton or it is half as large or 40 percent as large as all three Hugoton Fields put together.

Q In all three states? A In all three states.

Q Now, Mr. Cooper, have you had occasion to study the existing rules and have made modifications in the existing rules to take care of your recommended allocation formula of acreage times pressure?

A We have taken the present existing rules and modified them to include the acres times pressure allocation formula.

Q In drawing up these proposed rules for the Blanco-Mesaverde Field in San Juan and Rio Arriba Counties, New Mexico, you have followed the existing rules with the deletion of deliverability and addition of a new Section 4 and 5 with respect to allocation following your present proposed program?

A That is correct.

Q Mr. Cooper, in allocating gas, it is quite evident, is it not, that it is almost impossible where you have limited wells to attempt to fulfill your market demand on a daily or even a monthly basis, is that correct?

A Well, if you mean a dailey nomination basis.

Q Yes.

A I think that is essentially true. I understand the pipelines want a longer nominating period. They want to nominate for a longer period to allow, they want to nominate for a longer period because they make long range forecast.

Q In line with the existing statutes of the Commission and in line with the desires of the purchasers to follow proration periods for stability purposes, does not your rules provide for a section which would insure such a thing?

A It provides a six months proration period.

Q In Section 5 of your proposed rules, you advocate the proration period and the assignment and consideration of underproduction and overproduction on a six months period?

A That is correct.

Q With balancing dates?

A Yes, sir.

Q With that provision in your proposed rules, it would be possible, would it not for the purchasers to fulfill their non-desirable market demand for the proration period?

A I believe so,yes.

Q You have also in attempting to comply with the recommended allocation formula made provision in Section 4 for pressure determinations, is that correct?

A That is correct.

Q As the rules are now written, it provides for a semi-annual pressure determination, you are continuing such a practice?

A Yes.

Q The dates of such semi-annual pressure determination is left blank depending upon the desires of the Commission?

A That is correct.

MR.SELINGER: We would like to offer in evidence, Skelly's Exhibits 4 to 9, all inclusive.

MR. SPURRIER: Without objections they will be admitted.

Q Mr. Cooper, in concluding, therefore, I want to ask you just a general Mother Hubbard question. In your opinion, do you believe that the allocation formula that you have recommended of one hundred percent acreage times pressure would more nearly approach the reserves under the various tracts as required under the statute than any other allocation formula?

A As the field is produced, I believe so, yes.

Q I want to read you this provision and ask you not for your legal interpretation but whether or not your recommended allocation formula will do what is required under the statute? That is the rules and regulations or orders of the Commission shall so far as it is practicable to do so afford to the owner of each property in a pool the opportunity to produce his just and equitable share of the oil or gas or both in the pool being an amount so far as can be practicably determined and so far as such can be practicably obtained without waste, substantially in the proportion that the quantity of the recoverable oil or gas or both under such property bears to the total recoverable oil or gas or both in the pool and for this purpose to his just and equitable share of the reservoir energy. Do you believe that your allocation formula will more nearly approach that objective than,for example, the two comparitive formulas?

A I do.

MR. SELINGER: I believe that is all.

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

MR. TURNER: Does the Commission wish to cross examine each witness or do you wish to finish direct and then go to cross?

MR. SPURRIER: Each witness.

CROSS EXAMINATION

By: MR. TURNER:

Q I would like to ask a few questions. Mr. Cooper, what is your title with Skelly Oil Company?

A I am a petroleum engineer.

Q Are you in charge of the petroleum engineering department with Skelly?

A No, sir, I am not.

Q Who is in charge of that department?

A Our Chief Engineer is Mr. W. P. Whitmore. Our executive Vice-President is Mr. J. S. Freeman.

Q Were you assigned to make a study of the Blanco Field?

A I did this work.

Q When were you assigned to do that work, Mr. Cooper?

A That came just prior to the last May 16th hearing.

MR. SELINGER: I assigned him to do that work.

MR. SPURRIER: The question was when?

MR. SELINGER: May 16, 1954.

Q That is roughly six weeks ago that you began your study of the Blanco Field?

A That is correct.

Q Have you been out in the field there during that six weeks period?

A No, I haven't been out.

Q You made an office study at the Skelly Office in Oklahoma?

A In Tulsa, yes, sir.

Q Where did you get these logs that you studied?

A I didn't have any logs.

Q You didn't have any well logs?

A No, sir.

Q What data did you study?

A The data reported to the Commission.

Q What was that?

A The data reported to the Commission.

Q By whom?

A By the operators.

Q You mean you get a transcript of the record?

A No, sir, I understand that the Commission's files are open to anyone who wants to go in and look at them.

Q I want to get for the record, I am not questioning that. We are entitled to know what you studied and the basis on which you arrived at this opinion.

A The basis for this opinion is an engineering fundamental to me.

Q We understand what your thoughts on it are, but there is some little difference in opinion.

MR. SELINGER: Are you asking about the factual data or are you asking about his opinion, are you talking about the data he secured?

MR. TURNER: I think this Commission is entitled to know whether he is an expert on the Blanco Field or whether he has made a superficial check on it.

MR. SELINGER: You sat through the presentation of direct

testimony and in each instance the witness testified from what data all these exhibits were taken from. I was very careful in every Exhibit to put that prefix on so there wouldn't be any question about it.

MR. TURNER: I may have misunderstood him.

MR. SELINGER: You misunderstood him eight times then.

MR. TURNER: Maybe so. I would like for him to tell us again if there is not any secret about it as to exactly the data he used in making these computations.

MR. SELINGER: These Exhibits?

MR. TURNER: Yes.

MR. SELINGER: All right, repeat them, Mr. Cooper.

A I used the data from the Commission's files showing well deliverability tests which I and one other engineer copied in Santa Fe last month.

Q I see. Those were the only records that you considered?

A Those were all I thought necessary.

Q So, you took well deliverability data from the Commission's files and it was on the basis of that information that you have arrived at the conclusion that you have given here today?

A No, sir. That conclusion again, is based on engineering principles.

Q It is on your judgment as a petroleum engineer of what that shows?

A No, sir, the formula that I proposed is on my judgment as an equitable formula based upon reserve as nearly as possible.

Q How many wells does the Skelly Oil Company have in the Blanco Fields?

A As operator or as an interest owner?

Q Well, you might tell us if there are two categories, you might give us both of them?

A I find two which we operate.

Q You operate two wells in the field?

A In the field, yes, sir. In the Blanco-Mesaverde. 12, I believe if I counted correctly, which others operate and we own an interest therein.

Q Are those wells in which your Company has a partial interest or undivided interest, the 12 that you have mentioned?

MR. SELINGER: You mean the working interest?

MR. TURNER: Yes.

A Which 12, we own a working interest in 12 wells as I counted.

Q You own the entire or partial?

A Partial working interest.

Q Could you tell us what percentage of those wells that the Skelly Oil Company owns?

A I couldn't tell you that.

MR. SELINGER: I don't think this information is very pertinent.

MR. TURNER: If we didn't have a single well, we are entitled to know the factual basis.

MR. SELINGER: I think you are wasting a lot of time with unnecessary information.

MR. TURNER: We want to show--

MR. SELINGER: (Interrupting) Go ahead, you can go far a field.

MR. TURNER: We would like to show that he has two wells and

a small interest in some others.

MR. SELINGER: And some undrilled acreage and drilling some wells now.

MR. TURNER: We will get into that.

Q How much undrilled acreage does Skelly have in the area?

A I do not know.

Q Could you approximate it?

A I could give you a guess of about 20,000 acres.

Q In the Blanco Field?

A I do not know in that area.

Q Well, the area?

A The field has been extended about 12 times.

Q You have drawn the outlines of the field up here on these maps, how many acres would you say you have within the outlines of the field as you have shown it to be?

A I do not know.

Q You don't know. Have you made any study of the reservoir conditions in the Blanco Field?

A I have read some of the literature published in the various trade journals and that has been the extent.

Q You have picked up a magazine and read it from time to time about the Blanco Field? A Yes.

Q Do you know that the Mesaverde is from 450 feet in thickness down to as low as, well to zero?

A Well, it must vary, there are dry holes.

Q Some of it, it is a wide variation, isn't it, if you are familiar with that. Does n't it vary?

MR. SELINGER: We would like to object to that question.

That is a question for a geologist. This man is here as an engineer. We are going to object to any question with respect to geology.

MR. TURNER: He is supposed to be an expert on reservoir capacities.

MR. SELINGER: We stayed away from the geological formation whatsoever. There wasn't a single question in the hour and a half that he was on the stand that had anything to do with geology.

MR. SPURRIER: Objection sustained.

MR. TURNER: We wish to note our exception if the Commission please. I think that is all.....Could I ask him another question?

Q Where are your two wells located, what part of the field?

A I couldn't tell you that.

Q You don't know where your wells are located?

A Wait just a minute. 24, 27, 28.

Q What was that?

A 24, 27, 28.

MR. SELINGER: Did you get that? 24, 27, 28.

A And 6, 29, 7.

MR. SELINGER: That is the Township, Section and Range.

MR. TURNER: Sections 24, 26, 27 and Section--

A (Interrupting) No, Section 24, 27, North 8 West, Section 26, 29, North, 7 West.

MR. SELINGER: You want the location of the wells that we have an interest in, the 12 wells?

MR. TURNER: No, I don't think we need that for the moment.

MR. SPURRIER: Mr. Smith.

By: MR. SMITH:

Q I am not quite clear, Mr. Cooper, as to just how you go about

adjusting these individual well allowables each month?

A Mr. Smith, the procedure that we followed was to first calculate the theoretical allowable or the allowable each well would have, if all the wells could make it. We then compared that allowable with the well capacity determined in the manner, I spoke of before. If the allowable was in excess of the capacity, we assigned that well its capacity and called it a limited well. We then, subtracted all of those wells, the capacity of all of the limited wells from the total nominations and recalculated the allowable for all the other wells. We then checked it again, capacity versus allowable and we followed that procedure until we found that all wells would make the allowable.

Q In arriving at the capacity of the well, what figure did you use for that purpose?

A We used the higher of two figures. We had production figures for 1953 on most of the wells and in a few cases, production figures we looked up for 1954. If during any month in 1953 the well produced more than 30 times its deliverability, we used production history as the capacity, that high month. If 30 times deliverability was the high figure we used that as capacity.

Q Then, as I understand your testimony, the basis for your rule would be the deliverability of the well?

A No, I used that only to find capacity.

Q To find the capacity of the well. In the absence of the deliverability test you used the actual production, is that right?

A Yes.

Q Coming back to the question that I just asked you, in order to work your formula and arrive at capacity, it is your recommendation,

as I understand it, that the Commission consider the capacity based on deliverability?

A No, sir.

Q What is your recommendation?

A I used deliverability because it was a newer figure. It was newer than the past history, I was attempting to get the maximum capacity of each well. My recommendation is and it is in the field rules also in under and over production that past history will determine when a well becomes limited.

Q In other words, its inability to meeta particular allocation that would be made to that?

A A particular allowable, yes.

Q As each of these wells accumulate over production, they are to be balanced in six months period, is that right?

A The provision for overproduction is that overproduction accrued during one six months period must be balanced out during the six months period. The well must be in balance at some point during the next six months.

Q It naturally follows that underproduction can't be balanced too, is that right?

A Yes.

Q If a well can't make up its underproduction during the six months?

A The underproduction accrued during the first six months is not made up during the second six months, it is cancelled.

Q Would it be possible under your formula for allowables to be so stacked, shall we say, to the point where at the end of the six months period, you might have the situation of certain of the

more productive wells being shut in for a period of time due to the fact that they have overproduced?

A It wouldn't necessitate a shut-in. They might have to reduce.

Q Is it possible by continuous stacking of allowables on wells that are unable to make their allowable assigned to them to result in the wells becoming more productive during the shut-in period?

A It is possible for a productive well to be shut-in provided it has overproduced greatly in excess.

Q If the underage is cancelled out, what about the overage, are you going to cancel that out?

A No, sir, the manner in which overage is handled at least my experience with the Carthage Field, overproduction is adjusted by adding that to the nominations since there is a market for that gas. Therefore, it should be added to the nomination and become a part of the allowable.

Q So, that under that theory, you would have no time that you would actually shut a well in?

A There shouldn't be, if the operator is in any way cognizant of what is going on.

Q In making----

MR. FOSTER: (Interrupting) Repeat that last answer.

A There shouldn't/be an occasion to shut a well in if a operator is watching his allowables. He shouldn't get overproduced enough to have to shut himself in.

Q In making your determination of the reserves in place, as I understand it, the only test that you made was again back to your deliverability test that had been filed and/or actual production?

A I made no calculation of reserves in place.

Q I understood from your testimony that your recommendation was to make sure that each of these wells produced the reserves they had?

A It is my feeling that the relative pressure decline between wells with production is indicative of the reserve between wells.

Q That the pressure alone is--

A (Interrupting) No pressure decline, not pressure alone, pressure decline with production.

Q Would be the only basis for determining reserves so far as the proration formula is concerned?

A That is the basis.

Q Isn't sand thickness also indicative?

A Yes, sir.

Q Don't you think that more equity would result if sand thickness were included?

A If it can be determined. I think, however, the equity would probably not be any greater.

Q In other words, you think that the average sand thickness from well to well is uniform?

A No, sir, but I think the change in pressure decline, the well in a thin sand will have a smaller pressure decline.

Q Isn't your pressure more or less dependent upon porosity and permeability? A Pressure?

Q That is right.

A Not bottom hole pressure, shut-in bottom hole pressure.

Q You don't think that permeability has anything to do with--

A (Interrupting) It enters into the time that requires a well to build up, yes.

MR. SMITH: That is all.

MR. CHAPIN: With Wood River Oil and Refining Co. Here is a man with six weeks experience in gathering statistics, doesn't know where his wells are, trying to tell us how to run the files. I request that his testimony be rejected as to not being qualified.

MR. TURNER: I would like to make the same motion. He has sought to compare the Blanco with the Carthage Field. As I understood, he said they were similar fields.

MR. SELINGER: He didn't say that. I will challenge the record.

MR. TURNER: We will take his statement about what he said about it.

MR. SELINGER: Show me in the record where he said they were similar.

MR. TURNER: At least he has sought to compare different fields and claimed this formula should be put in Blanco Field because it applies in another field. As this gentleman points out the witness is not shown to be qualified. We move that his testimony on that point be stricken and we join in the motion to strike his testimony as a whole.

MR. SPURRIER: This Commission feels that the witness is qualified and said so at the beginning of the witness's testimony, qualified as to what he testified to. We also understand what he is testifying about. Anyone else have a question of Mr. Cooper? Mr. Howell.

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

By: MR. HOWELL:

Q Mr. Cooper, referring to Skelly's Exhibit 4, as I understand

your testimony, you have designated the well capacity either by the actual production or by taking 30 times the deliverability. In one column, these are listed with an asterick. Which character of figures is shown by the asterick. Is that the calculated figure?

A That is the calculated figure based on deliverability, yes, sir.

Q So, that the asterick here in both columns, if I am correct, show at least half of the wells you have given a calculated deliverability that was in excess of what they actually produced during the year, 1953?

A I don't know the number, Mr. Howell.

Q You might take a look here.

A I assume it as about half.

Q It is approximately half, is it not?

A I believe it is, approximately, half, yes, sir.

Q Then, your testimony is based upon an assumed figure that in operations the well actually did not produce?

A It had produced up to this time.

Q Furthermore, in continuing your calculations and applying your different formulas, you assumed that each of the wells would be on the line 30 days out of each month?

A That is in here, in assumption, yes, sir.

Q That is your assumption, you are assuming that there are not shut-ins of any of these wells, you are assuming in making that calculation that the market demand is constant so that a well can be permitted each day to produce that day its allowable, haven't you?

A I have assumed the constant market demand because there were

just too many calculations to make the difference.

Q All the figures that you have given us here are based upon that assumption of the constant market demand the same volume each day?

A We presented other exhibits to show the effect of the change in market demand.

Q But this particular Exhibit 4 that we are referring to and Exhibit 5, all of your computations there are based on those assumptions?

A They were based on that constant market demand, yes, sir.

Q So, that if your Exhibit 4 shows and if you will check it, I believe you will find that you have some 60 of the 335 wells that are what you call the limited wells under that calculations, is that correct?

A Under which formula, Mr. Howell?

Q Under the basis of calculations you used 75-25 there are approximately 60 wells, are there not, that would be limited wells?

A As I counted, there are 71.

Q 71? A Yes, sir.

Q There are a number of those wells which, if not produced every day at the same volume or which if shut-in, would then become limited wells?

A Yes, sir.

Q And that there are more and more wells that become limited wells, that simply cannot make their allowable as the formula is changed giving more emphasis to acreage and less to deliverability?

A That is correct.

Q From the standpoint of the market, the marketer of gas has got to market the gas on the days and the months and the times when

the market is available, doesn't he?

A I presume so, yes, sir.

Q And that if a well on a fluctuating operation fails to make its allowable in a continued fluctuating operation, there is very little opportunity of that well ever making the allowable and that gas ever being marketed, isn't there?

A The well would be placed on limited capacity based upon its capacity.

Q But even though it be placed on limited capacity unless the operation is a constant day by day taking of the same amount of gas that well is going to continue to fall behind from time to time, isn't it?

A I believe that is essentially correct.

Q So, that that gas that is underproduced from that well just can't be made up?

A No, sir, it is also cancelled off.

Q It has to go to--

A (Interrupting) Cancelled off the proration.

Q It is cancelled off and isn't available and can't be made up and isn't available for marketing?

A It isn't available, that is right.

Q Unless it has been obtained from wells that have deliverability that market simply isn't made?

A I presume it would be obtained from those wells that would accumulate overage. The overage would be added to the nomination and be part of the allowable.

Q The result is that constantly the ability of a well to deliver continues to give it a larger percentage of the production from the

field, isn't that true?

MR. SELINGER: Would you mind rephrasing that so I can understand.

Q The ability of the well to deliver under any formula is going to result in that well producing a larger proportion of the production from that field than the wells that can't deliver?

A If I can, Mr. Howell, I think I can answer your question in this way. The better wells in the field as the field is produced will get an increasingly larger share of the market.

Q Regardless of what formula is used?

A Regardless of what formula is used, correct.

Q You spoke a little while ago in your method that the two wells, I believe the illustration was used with varing sand thicknesses that you would expect the pressure to decline on the well that had the lesser thickness more rapidly than the well with the greater thickness?

A I think I said reserve, other than that the statement is correct.

Q If the reserves of one well are greater than the other well, the well with the lower reserves you expect to have its pressure decline?

A More rapidly.

Q And also the deliverability will decline more rapidly, wouldn't it?

A The deliverability of the well will decline with its pressure against a constant pressure.

Q That is right, so that as against a constant decline pressure the deliverability of the well with the lesser reserves declines as

the pressure declines?

A Yes, sir, but I think not in direct ratio with reserves.

Q That is your opinion on that particular matter?

A That is right.

Q Referring to your Exhibit No. 2, I believe you have taken two colors and shown as your yellow, the half sections with zero to 100,000 and then in pink, the 100,000 to 300,000 deliverability. Actually those two groups really belong about together, don't they?

A Well, they are both kind of sorry.

Q They are both sorry. They are both going to be the limited wells that we talk about?

A Yes.

Q We find both of them pretty well scattered over the flanks of the field, don't we? We find the two colors rather concentrated around the flanks, the yellow and the pink, do we not?

A They are more or less concentrated. They are also there in the middle, the pink not as much as the yellow. The pink is scattered lightly.

Q And also you find, for example, in your high deliverability with 1,000 to 5,000 MCF daily for which you use a gray, you find several rather solid blocks of that toward the center of the field, do you not?

A Not very big blocks but there are some blocks there.

Q There are some solid blocks there and, of course, as to this shown in white on your studies, you don't know what the wells are going to show when completed?

A I do not know,that is correct.

Q Furthermore , did you make any effort on any of the instances

that you chose to determine the number of feet of sand that was exposed in the well bore?

A I did not.

Q You didn't take into consideration whether a well was completed only in the Cliffhouse or in the entire Mesaverde?

A No, sir, I assumed that if the entire Mesaverde was productive, the operator had the whole thing open, maybe it was a bad assumption.

Q As a matter of fact, you know there were some wells that were in the early days completed only in the Cliffhouse and from time to time they are being reworked?

A That is what I understand.

Q Also in making your studies, did you give any consideration to the improved techniques of completion that have taken place?

A Mr. Howell, I didn't consider that either because I don't think deliverability has any bearing upon what I have proposed. Again, it is my opinion as you say, but it is still my opinion that deliverability has no relationship to reserve.

Q In reaching that conclusion you failed to take into consideration these factors that I have mentioned?

A I did not take them into consideration.

MR. HOWELL: Thank you.

MR. SPURRIER: Mr. Howell.

MR. HOWELL: Could I ask one more question?

MR. SPURRIER: Yes, sir.

By: MR. HOWELL:

Q In applying your formula, would you allow more than 320 acres for any one well?

A I think that is pretty well loaded. I will put it this way, Mr. Howell, if after a notice and hearing which would be required the Commission felt that a well would drain in excess of 320, I would have no objection to allowing more than 320.

Q You would do that regardless of the capacity of the well to make deliveries into the pipeline?

MR. SELINGER: If the Commission please, this witness has not testified on direct examination as to what size unit,the existing rules now call for 320, we have no opinion as to whether it should be 320,640 or 980.

MR. HOWELL: The question I am asking and I think it is a pertinent question, Mr. Selinger.--

MR. SELINGER: It is improper cross examination. If you want to make him your witness. Nothing was said about the spacing.

MR. HOWELL: I haven't read the rules. I think it is a pertinent question to ask whether the rules provide for multiple units. I will ask the Commission to rule on the admissibility.

MR. SELINGER: At the time that I introduced the field rules, we explained to the Commission that no rules, none of the existing rules were changed except the addition for the Section 4 for allocation and Section 5. I made it nuclear that we had no changes for the other existing rules.

MR. SPURRIER: Does the witness care to answer the question?

MR. SELINGER: Go ahead and answer the best you can.

A If you will repeat your question, I will do my best to answer it for you.

Q Would you give us a multiple allowable to a well where a lease had more than 320 acres regardless of its ability to deliver into the

pipeline or not?

A I think the ability of the well to deliver into the pipeline is the concern of the operator and if he wants to take that loss then it would be his business and I would be willing to grant him the additional allowable.

MR. HOWELL: Thank you for answering the question.

MR. SPURRIER: Before anyone else cross examines this witness, perhaps I should make the Commission's position clear. In the first place, I said we understood what the witness was talking about. That is questionable. I don't mean to be facetious and I would direct some of these remarks to Mr. Turner and this gentleman from Wood River that this Commission accepts statements and I think that Mr. Cooper made his testimony, the type of testimony which he was giving very clear. I don't think your objection was in order at the time that you made it. We would like to have statements from all of you and we would like to have proposed rules in this case. We are not being arbitrary when we deny Mr. Turner what he called the right to cross examine. Counsel objected to the cross examination because it wasn't covered in direct examination. We agreed with it. The rules of the Court do not all apply here or this Commission does not conduct a hearing in the manner of the Court, yet we have to have some conduct of our hearing and if you wish to object, I think you should, then the Commission can rule on the objection.

In other words, your position has to be clear but the Commission wants a complete record and we also want everyone to have an opportunity to state their case. Now, Mr. Chapin from Wood River.

MR. CHAPIN: I would like to ask the witness another question.

MR. TURNER: Mr. Spurrier.

MR. SPURRIER: Let Mr. Chapin.

By: MR. CHAPIN:

Q You are qualified as a petroleum engineer?

A Yes.

Q Do the duties include going in the field, setting pipe, setting the well and completing the well and operating them? Those are the duties of the petroleum engineer, aren't they?

A That is a company designation and means different things in different companies.

Q Most companies use petroleum engineers to do those operations?

A Not this company.

Q Most companies do, don't they? A I don't know.

Q Most of them do, they do use them to complete the wells. You have not done that out here in Blanco?

A No.

Q You have never turned a valve?

A No, I have never been in Colorado.

Q You never set pipe in the Blanco?

A Never been in the North West corner.

Q Never shot a well, don't know anything about the reservoir characteristics but from the statistics, you qualified as an expert and tell us how to run the field.

MR. SELINGER: Answer his question. The answer was yes to the last question.

MR. CHAPIN: I still say he is not qualified to do it. He is not qualified as a petroleum engineer in the Blanco Field. He is qualified as a statistician.

MR. SPURRIER: Do you have testimony to introduce, Mr. Chapin?

MR. CHAPIN: No, sir, I am just asking questions.

MR. SPURRIER: Anyone else have a question of Mr. Cooper?

MR. GRENIER: Yes, sir, Mr. A. S. Grenier, Southern Union Gas Company.

By: MR. GRENIER:

Q I believe, Mr. Cooper, you proposed in your rules to determine pressures for purposes of your formula at approximately six months intervals, is that correct?

A That is correct.

Q How long or what was the method of pressure determination that you were going to use?

A Are you meaning bottom hole pressure?

Q Yes, as I understand it, you were going to use bottom hole pressure, is that correct?

A That is right.

Q How did you propose to determine those bottom hole pressures?

A There are three methods to determine the pressures and I think the selection or the election should be left up to the operator. Of course, what we consider to be the most accurate would be to run a bomb, which is a little time consuming and some people don't like to do it. The second method would be to have a zonic survey made because some wells in the field do make fluid and have that made to determine fluid level and calculate from a shut-in surface pressure with gas and fluid level to datum. The third would be the purchase calculation of the bottom hole pressure assuming gas only in the hole.

Q Would you leave that up to the option of the operator as to which one of these tests he would use? Would you think it preferable

to have some uniform standard established to be observed by all operators?

A I think it should be left to the operators.

Q He could try whichever he liked best and whichever came out with the most favorable pressure, that would be the one he could use?

A I think he is entitled to the most favorable pressure, yes, sir.

Q So, that you don't think it would be necessary then to have a shut-in pressure, a shut-in necessarily of seven days twice a year on each of the wells?

A There is a shut-in twice a year provided in these wells.

Q Have you made a study as to the effect of shutting in some of the smaller wells for 14 days a year would have on the production of gas from those wells? How, adversely, would it effect these wells to have to shut in for that length of time each year?

A I think I answered that in response to one of Mr. Howell's questions that it would in effect give the well or the well would produce less than the capacity that we have indicated for limited allowable wells, because this was built on an assumption of a well produced every day.

Q This is merely then a further aggravation of the problem that Mr. Howell was getting at in his cross examination. Then, in addition to having some days when, because of the total take from the field, we weren't pulling every well as full capacity there would also be some days when these smaller wells would be shut-in and able to produce nothing at all?

A They would be shut-in, yes, sir.

Q Are you familiar with the length of time it takes in this

field for wells to stabilize their pressures when they are shut-in?

A Not to any extent. I put the seven day shut-in in here because that is a present rule for shut-in well head pressures taken with the deliverability tests.

Q You are expressing no opinion as to whether or not seven day shut-in is or is not adequate to give a stabilized pressure?

A I think probably in some cases it would not be.

Q In your formula, you are making use of only two factors, pressure and acreage, bottom hole pressure and acreage, is that correct?

A That is correct.

Q There are some other factos which are generally recognized as having some bearing on reserves and I believe you said that your formula was one which you believed would result in allowables per well as nearly as practicable in relating to the underlying reserves, is that correct?

A That, I believe, is my statement.

Q How would your formula take into account, variances in porosity, for example, as between wells in this field?

A I can best answer that, I think by the statement that was made along with one of the Exhibits that if you take two wells where everything is equal except reserve, that difference could be brought about by variance in porosity.

Q Could it also be brought about by variance in sand thickness?

A Yes, sir.

Q It is also your feeling that the decline in pressure relative to production will adequately compensate for variances between wells, either in sand thickness or in porosity or in any other factors that

there may be affecting reserves?

A As nearly as possible.

Q I believe you testified that there was a ratio of approximately 1.84 to 1 between the top allowable and the minimum allowable, if your acreage times pressure formula was adopted, is that correct?

A That is the ratio which we, the ratio of the allowables under this formula based on this total allocation we used to calculate. Under a different total nomination or total allowable it would be a different ratio.

Q Would that ratio increase as the takes went up or would it decrease?

A It will increase as the takes go up. It will increase for all three formulas.

Q I am talking particularly about your formula.

A Yes, it will increase.

Q Let's limit this to yours for the moment. Do you feel that a ratio of 1.84 to 1 between the highest and lowest allowable will adequately compensate for variances in reserve such as might be anticipated in a field of this kind?

A I feel this way, Mr. Grenier, that the 1.84 was the figure that we calculated here. That ratio would not necessarily hold between the same two wells with further production. I do feel that the compensated ratio for pressure decline with producing history would hold to the reserve.

Q In other words, over a period of time it will come out to about the right result, is that what you are saying?

A That is essentially what I am saying, yes, sir.

Q Do you feel that your ratio of 1.84 to 1 will provide an

adequate incentive to operators to use and develop more effective completion or recompletion methods?

A To me, the incentive to develop more effective completion or recompletion methods is primarily with deliverability included from a proration formula, the incentive is still there to get a higher percentage of recovery.

Q If the best you can do is only 84 percent better than the worst and all you do have to do then is get a well a little bit better than average to be as well off as you could, why would you be interested in getting the very best instead of getting a pretty good one?

A Well, just a minute. Let me get a figure or two out of here. The difference of maximum and minimum allowables under the pressure times acreage formula is about 14,000,000 per month. The incentive is to get a better well to produce that 14,000,000. In other words, a well, there are wells in there which had a higher allowable but which didn't have the capacity to produce it. The incentive to get the 14,000,000 a month, that is 14,000 MCF at ten cents a thousand, is a pretty good incentive.

Q I am assuming a well that has a capacity on your basis of making this extra 14,000,000 million a month. There are some other wells which in addition to making that 14,000,000 could also make another 14, or two, or three, or four more, 14?

A Yes, sir.

Q What incentive would there be left after you had gotten up to the first 14, why should a fellow worry about trying to get any more than just this rather low maximum?

A Well, I think the answer to your question is that he would

worry because later on that low maximum might not be enough. In other words, with an increased nomination or an increased take from the field he would then go on a limited capacity. It is my understanding that the market is expanding in this area.

Q It probably even then would not be as much incentive if we assume what greater ratio between maximum and minimum allowables were provided?

A I can only speak from experience with my own company and it is always our incentive to get the best well possible.

Q At the least cost?

A Yes, sir, certainly that goes without saying.

MR. WALKER: Mr. Turner, did you have a question you wanted to ask?

MR. TURNER: I just wanted to inquire if the Commission had ruled, I was going to ask Mr. Spurrier if the Commission had ruled that they would not allow cross examination of the witnesses to show the qualifications and what experience they had. He said we were somewhat out of order in proceeding along that line. We didn't wish to transgress it. We do wish to except the ruling of the Commission denying us the right of cross examination.

MR. WALKER: I will let Mr. Spurrier answer but I can answer for myself. I don't believe that was the intent, as far as I am concerned you can cross examine the witness any time you feel like it, as far as his qualifications. I think Mr. Spurrier meant as far as the direct testimony that the witness had given. I think there was some doubt in his mind as to whether your cross examination was his qualifications or his direct testimony. I think that is what he was trying to bring out, however, when he comes in, you can

ask him for his own thought on it. Does anyone else have a question of the witness?

MR. GALLOWAY: L. D. Galloway, El Paso Natural Gas.

By: MR. GALLOWAY:

Q I would like to ask if he intends to base his pressure on the seven day or maximum bottom hole pressure?

A The rules as written call for a seven day period. As far as I am concerned, I see no reason to put any limitation other than if you don't put a limitation then, the Commission would have trouble scheduling the pressure test within a given time period.

Q Are you aware of the time that is necessary to reach a maximum bottom hole pressure?

A I think I answered that one once before.

Q It is from 30 to 40 days.

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

MR. SPURRIER: If no further questions of the witness, he may be excused. Do you have some more questions, Mr. Turner?

MR. TURNER: Not from that witness.

MR. SELINGER: That is all the testimony we have on the part of Skelly Oil Company, except the fact that we wish to make a statement at the conclusion of the hearing, we rest now.

MR. SPURRIER: Very well. We have two cases on the docket, which I have been requested to set up, Cases 741 and 742. We will recess for lunch and come back at one o'clock. Anyone that doesn't care to hear these two cases, 741, 742 could expect to be back at 1:15. We would like to get those cases out of the way.

(RECESS)

A F T E R N O O N S E S S I O N
June 21, 1954

MR. SPURRIER: The meeting will come to order, please. We started out with Stanolind. We got to Pubco who moved over in favor of Phillips, who moved over in favor of Skelly. We will try Pubco again.

MR. KELEHER: I would like to have Mr. Frank Gorham called as a witness and sworn.

F R A N K D. G O R H A M,

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

DIRECT EXAMINATION

By MR. KELEHER:

Q State your name.

A Frank Gorham.

Q What official position do you hold with Pubco, Inc.?

A Chief geologist and vice-president.

Q Mr. Gorham, you are a resident of Albuquerque, New Mexico, are you not?

A That is correct.

Q Can you state your qualifications as a geologist? That is, to say, do you have a degree, did you specialize in geology in your school?

A I am a graduate geologist from the University of Missouri. Since time in the Service I have spent working as a geologist with Standard Oil of New Jersey in Venzuela, with the Pure Oil in Denver,

Colorado, and since the inception of Pubco in the San Juan Basin.

Q When did you begin in the service of Pubco?

A March 1, 1951.

Q Subsequent to that date, have you had occasion to make frequent trips of an extensive nature in the San Juan Basin?

A That is correct.

Q If you will state to the Commission, please, in what way the company has an interest in proration of gas in the Blanco Mesa-Verde Pool?

A Pubco Development, Inc., owns leases covering 12,974 proven acres in the Blanco Mesaverde Pool, of which 7,023 acres are developed for Mesaverde production. The company operates or has an interest in 36 gross wells in the pool, or a net full interest totalling 23 producing Mesaverde wells.

Q Can you break that down as to how many the company operates?

A The company operates approximately 18 wells. I beg your pardon, operates 28 wells.

Q And has an interest in the remaining?

A That is correct.

Q Of a total of total of 36?

A Yes, sir.

Q Will you please state, for the benefit of the Commission, those factors and precepts which, in your opinion, should be considered and should be incorporated in an equitable gas proration formula, and the reasons, as you go along, for your opinion?

A An equitable proration formula will enable each well to

currently produce its fair share of the market, based upon its reserves, and ultimately produce approximately the amount of gas underlying the approved drill site upon which it is located. In view of the widely divergent conditions existing in the various gas producing areas, regulatory bodies have developed and approved several types of formulas involving many different factors both as multipliers and as additives. The determination as to whether or not a given pool is one reservoir or a number of reservoirs is one of the major factors, and directly concerns the problem of gas proration in the Blanco Mesaverde gas pool. In the Kansas-Hugoton accepted formula, acreage devoted to the well was used as a multiple with well deliverability even though the pool was developed on an irregular spacing pattern and the pool was actually one reservoir.

In the Blanco Mesaverde Pool, such a multiple type formula would be even more equitable in that I do not believe that it is one reservoir, but a large group of interbedded individual reservoirs which have been developed on an equal spacing pattern.

Q Is it correct to state that, in your opinion, the basic problem is the establishment of the true reserves which can be allocated to each producing well?

A Yes, it is correct. To further elaborate, the immediate problem in the Blanco Mesaverde Pool is to establish the presence or absence of drainage from one Mesaverde well to another, and whether or not individual drill sites have more or less reserves than other or adjacent drill sites.

Q In connection with the preparation for this particular

hearing, have you had occasion to make rather an extensive study into the problems involved here?

A Yes, I have.

Q And in connection with that study, have you prepared a map to show more or less reserves in other or adjacent wells?

A Yes, I have. I would like to present as evidence, Exhibit Number 1 "A".

Q I will ask you, at this time, to state whether or not Exhibit 1-A and the other Exhibits to which you will testify here today were, or were not, prepared under your direction?

A They were prepared under my direction and supervision and checked, personally, for accuracy.

Q To a considerable extent based on your personal knowledge?

A That is correct.

Q I will ask you, at this time, to demonstrate from Exhibit 1-A and discuss that.

A Exhibit Number 1-A is a regional cross-section of the Mesa-verde group obtained from measured sections of the group outcrop around the periphery of the Basin, and was taken from published information of the United States Geological Survey and the Geological Society of American bulletins.

Q At this time I will ask you to take your pointer and explain that Exhibit 1-A.

A This is Exhibit Number 1-A (indicating) and the sections which were measured by the United States Geological Survey show that not only does the entire interval of the Mesaverde formation

as it outcrops around the Basin itself, vary in overall thickness, it varies extremely in actual content as to whether it is sand, shale or coals. For example, in the far northeast portion of the Basin in the Pajarito River area of LaPlata County, Colorado, there are only 422 feet of Mesaverde section in that particular area which is divided into sands and primarily shales.

To the west, in what may be considered the northwest portion of the Basin there are 1,020 feet of sediments which are broken down into the Cliffhouse sandstone, the Menefee formation and the Point Lookout sandstone formation. By that I mean that there is a large massive groups of sands at the top of the Mesaverde group. There is a series of sands, shales and coals in the middle part of the Mesaverde group and the basal portion of the Mesaverde group does have a large amount of interbedded sands.

As we go further around the Basin to the far west portion of the Basin, we have an overall section of 1,628 feet which generally is broken up but can't possibly be classified into three separate major overall groups.

As we go to outcrop Number 4, which is located in the southwest part of the Basin there is a total of 1,800 feet of sediments in the so-called Mesaverde group which actually varies so much in stratigraphy and sedimentation that they have been allocated in entirely different names in that particular area, the Allison, Hasta, Gibson, Bartlett, Dilco, Gallup, all of which are considered members of the Mesaverde group. Those members are not traceable for any parti-

cular distance northeast into the San Juan Basin, but are there then classified into the overall major groups of Cliffhouse, Menefee and Point Lookout.

Now we go to the final outcrop, which is located in the southeast portion of the Basin. There is a total of 1,295 feet which is similar to the other outcrop measured before. It is primarily sand, shale and some coal.

Q Have you prepared, and are you ready to present to the Commission an Exhibit which has been marked Exhibit 1-B?

A Yes. In order to further clarify the actual situation of the Mesaverde group in the San Juan Basin and then to go into the Blanco-Mesaverde Pool, we constructed an electric log cross section which shows the general characteristics of the Mesaverde group, starting off from 21 North, 13 West and 20 North, 10 West to 21 North, 9 West to 27 North, 4 West to 29 North, 11 West in the Blanco Mesaverde Pool proper, southeast into 30 North, 6 West and 29 North, 5 West.

Those electric log cross sections portray approximately the same thing on the first exhibit, whereby you have an overall large group of rather poorly developed sands interbedded with some shales. The entire area or zone is called the Mesaverde group. The Lynn Oil Company Hoxie State Number 1 has some more definitive sand and shales. It is, here it is broken down in the Mesaverde, the Allison, Gibson, Bartlett, Dilco and Gallup sandstones.

When we approach the southern end, or very close to the

Blanco-Mesaverde Pool proper we start to develop the general overall features of what everybody considers for this discussion. The Mesaverde group, we are starting to reduce in overall section, the sands appear to be coming somewhat more abundant, and at the base of the Mesaverde group is a massive collection of sands which has been designated the Point Lookout member in some instances. The O. J. Lily Well; H. K. Riddle Number 1 in Section 7 of Township 27 North, Range 12 West has somewhat similar characteristics. Then we go into the actual field proper, where we actually define the Cliffhouse member, the Menefee member or the Point Lookout. In that particular definition there has never been any attempt to trace one sand to another, but we are merely agreeing to the point that at the top of the Mesaverde group there is a series of sands divided from the lower group of series of sand by a primarily shale coal sequence. Notice that although the Cliffhouse appears fairly well developed in this particular area that it is not recognizable a short distance away.

As we go further northeast--- southeast into the Basin proper, we go to Phillips Mesa - 6 Number 1-9, which on that particular gamma ray neutron log it is almost impossible to define the so-called Cliffhouse, Menefee and Point Lookout, but actually is a sandy zone left in the Mancus shale. As you go further northeast the sub-surface Mesaverde group is almost entirely gone.

Q Mr. Gorham, you have undertaken to demonstrate that the Mesaverde group within the Blanco-Mesaverde Pool varies in its physical characteristics. Do you have any further evidence indi-

cating that the Mesaverde group varies in the recoverable gas reserves?

A Yes, I have Exhibit Number 2-A and 2-B.

Q At this time would you take Exhibit 2-A and state what it is?

A Exhibit Number 2-A is a cross section of gamma ray neutron logs of the Mesaverde group in the Blanco-Mesaverde Field proper. Superimposed upon these gamma ray neutron logs are temperature surveys. This particular procedure was instigated, approximately, six months ago to a year, when it was decided that in the open hole it is quite possible that we could decide or determine which particular sands were productive, by a cooling from the normal temperature grade. In other words, when dropping the temperature sound in the hole we could expect a normal temperature increase to the right as with depth. However, a deviation to the left or a cooling would be apparent opposite those zones which are producing or were producing gas in the well bore.

Q Now, at this time, Mr. Gorham, are you directing your attention to Pubco wells?

A In this particular exhibit, this cross section shows wells owned and controlled and operated by Pubco Development, Inc. only.

Q You have personal knowledge of these wells regarding which you are now testifying?

A Yes, I do. The first well is Pubco Development State Number 15, located in Section 36, Township 32 North, Range 12 West. It has been our customary practice, as it has been with the majority

of the operators who have acreage wells inside the limits of the Blanco-Mesaverde Pool to complete their wells in the base of the Luis shale and leave open to the well bore all those sands which could contribute gas down to the top of the Mancos shale. This particular temperature survey would indicate that we were getting a small amount of gas or at least some gas from a portion of the overlying sand group of the Mesaverde group and that we were also getting a certain amount of gas from individual sand lenses in the so-called Point Lookout section, and possibly some in the so-called Menefee section.

I would like to emphasize that the reason the section was set up on a common point at the base of the Luis shale, which is an electrical marker which could be readily identified from one well to another and is what our company uses for structural interpretation of the area. We have found that we cannot trace from one well to another any particular individual sand over any particular distance. In most cases this cannot be traced from one well to another. In some instances they can be traced for a period of one or two wells, but cannot be used as a structural marker.

The second well is the Pubco Development Johns Federal Number 2, which also has a temperature survey superimposed, and shows a rather large amount of gas being produced in the upper sand zone, which is certainly a different structural zone or a different sand than the well which is located to the west of it. Again we show a rather large, extremely large probable increase of gas in the upper part of the sand and a rather massive entry of gas in the

lower zone.

The next well, Pubco Development Johns Federal Number 1, which is a direct offset of Section 18, Township 32 North, Range 11 West, shows that in the so-called Cliffhouse zone at thetop of the Mesaverde group, that we apparently have two gas entries as compared to the Point Lookout where we have one overall gas entry. Apparently all of these individual sands are contributing where, to the offset well there was certainly a void zone.

This particular well, Pubco Suter Federal Number 3 of Section 14, Township 32, Range 11 shows the gas entry in the Cliffhouse and what apparently is a gas entry in a large number of sands in the Menefee formation.

Further east, is Pubco State 13, in Section 36 of Township 29, Range 8, shows three specific gas entries in the Cliffhouse zone. Little or no gas is apparently entering the well-bore in the Menefee zone, however, the basal sand of the Point Lookout is contributing a large amount of gas.

Further to the east, Pubco San Juan Number 11, producing gas from a particular zone in the Cliffhouse, apparently either the basal Menefee or the upper Point Lookout and a large amount in the lower section.

A direct offset well, Pubco Development, San Juan 28-7 Unit Number 10 in Section 26, 38, 7, shows a variation from the normal temperature gradient in the Cliffhouse which is almost not comparable to the offset well and shows two specific gas entries, what looks like apparently could be

a cooling effect in various portions of the Menefee zone and a slightly heavier entry in the so-called Point Lookout zone.

Q Have you prepared another exhibit which will amplify your statement?

A Yes, Exhibit Number 2-B. This exhibit shows four wells in the so-called Glade area of the western-most part of the Blanco-Mesaverde Pool, but well within the field limits. On the west is the Southern Union Hubbard Number 2 well, located in Section 11, Township 32 North, Range 12 West and shows that this particular well casing was set at approximately a depth of 4700 feet, well through the so-called upper member of the Mesaverde group, which in that particular area has been found to contain either non-commercial amounts of gas or gas associated with water, or found to be from a practical point of view, non productive.

This section is set up again on a common point in the Luis shale, which from a structural viewpoint can be correlated from one well to another.

To the east a half mile from the first well, Southern Union Chamberlain Number 1, in Section 14, Township 32 North, Range 12 West, again it was found necessary to set the casing at approximately 5,000 feet or what apparently -- or what definitely is in the lower Menefee zone, and the Cliffhouse upper sand zone is believed to be, and known to be in that particular area as non-productive, and in most cases water bearing.

To the east approximately a mile and a quarter, and this particular well has no intervening wells, incidentally, Pubco Development,

Johns Federal Number 2 in Section 18 of Township 32 North, Range 11, West, a completion was made at the top of the so-called Cliffhouse section, or in the basal Luis the entire zone was drilled with gas and we ran a temperature survey. The temperature survey, without a doubt, shows a gas entry in the Cliffhouse zone, a gas entry in the Point Lookout zone. It is quite obvious that, since in these two wells it was necessary to case this particular zone off, that this well has more reserves than the offset wells, by the mere fact that the entire section is opened and at least three major zones are producing gas, as compared to possibly one or possibly two zones in the basal Point Lookout and the wells to the west.

Again further to the east, but a direct offset to this well, Pubco Development, Johns Federal Number 1 in Section 18, Township 32 North, Range 11 West, was completed in a similar fashion whereby the casing was set above the Cliffhouse sand zone and a gas entry was shown to us by the temperature survey in both the basal and the upper portion.

It is well to point out at this time that those wells which have only a small comparable zone open, show an initial potential open end flow of 268 MCF and 900 MCF as compared to 4,050 MCF and 3,090 MCF, portraying the fact that with the larger reserves, with the larger amount of sand that one can expect, and one should have and does have a much higher potential or deliverability.

In summary, this exhibit or cross section that I have discussed shows wells drilled in the so-called area of the Blanco-Mesaverde Pool. It demonstrates, by the use of temperature curve, the entrance

of gas to the well bore and specifically shows in certain wells that gas is produced from the entire Mesaverde section where neighboring wells have found only the basal Mesaverde productive or to contain recoverable gas reserves.

It further shows that well potential or deliverability is a function of recoverable gas reserves. I should like to emphasize that this cross section does not portray an isolated instance where only two wells in the Blanco-Mesaverde field are completed in the basal member of the Mesaverde group, but that this situation of small sand section and accompanying low reserves and deliverability occur in 142 wells completed within the field limits. These sub-marginal wells represent 20 percent of the total 704 completed wells at the present time. Any proration formula which would subsidize these wells would do so at the expense of average or better than average successful completions, and would tend to promote and accelerate the completion of many additional small reserve wells which are actually economic failures. Only those companies which derive their major revenue from gas transmission and marketing could possibly afford to absorb the low and questionable economic return of submarginal Mesaverde gas wells. A proration formula which included any other factor than deliverability would only subsidize the weak wells at the expense of the average and larger reserve wells. Such a policy would deprive the incentive to the producing company or independent, and would force him to invest his risk capital in other basins or areas.

Q / From time to time during your testimony, Mr. Gorham, you have

mentioned "recoverable reserves." Please state to the Commission what you mean by that term and amplify it.

A The Mesaverde group is known to contain gas well beyond the limits of the Blanco-Mesaverde Pool, but in most instances either in non-commercial quantities, or associated with large amounts of water. Therefore, I have used "recoverable reserves" in those instances where the gas could be produced at the well head as compared to gross reserves which gives consideration to so-called gas reserves which will never be produced.

Q There has been some indication in the testimony that large potential wells with high deliverabilities are, in fact, draining reserves beyond the established spacing pattern and the high deliverability is not indicative of higher reserves. Do you have any additional information which would indicate to the contrary, in your opinion?

A Yes, I do. Exhibit 3.

Q At this time I will ask you to take Exhibit 3 and discuss it with the Commission.

A This Exhibit Number 3 shows four wells which are operated by Pubco Development, Inc., which are direct offset wells. The first well is Pubco Development, State Number 8 in the southwest quarter of Section 36, Township 32 North, Range 11, West. The second well is Pubco Development, Inc., State Number 9 located in the northeast quarter of Section 36, Township 32 North, Range 11 West. The third is Pubco Development Inc., Hamilton Federal Number 1, located in the southwest quarter of Section 30, Township 32, North, Range 10

and the final well is Pubco Development, Inc., Hamilton Federal Number 2 located in the northeast quarter of Section 30, Township 32 North, Range 10 West.

This exhibit portrays the gamma ray neutron logs in those particular wells. It will be pointed out by others that at the uppermost portion of the Mesaverde group a series of sands exists, which can be called the Cliffhouse in between which, or below, is a so-called Menefee group and at the basal portion is the so-called Point Lookout. Our company, in all sincerity has never been able to utilize any particular sand as a marker bed for structural purposes because such sands do not exist from one well to another. The over-all characteristics of a massive series of sands at the top and at the base definitely are there, but those sands are not connected from one well to another. They are absolutely over a short period of distance and will die out. For example, let's take this particular group in here (indicating). This thinning has been set on what could be considered the base of the so-called massive Cliff-house, but we have found that it is very simple to go over from one sand leg to another and end up with improper structural period. This particular two sands group devoted into two, possibly in here (indicating), but thinning, become unrecognizable within direct offset wells.

The important point of this exhibit is that all four of these wells were completed at approximately the same time, and have been producing over six months, and liquid samples were taken from the wells as they were producing. These liquids are produced in association with the Mesaverde group gas. In this first well, Pubco

State Number 8, we are producing 61.7 degrees A. P. I. gravity distillate, which is transparent in color. In this particular well, Pubco State Number 9, a direct offset, we are producing 63.1 gravity distillate which has a slight physical change to a yellow cast. A direct diagonal offset, Pubco Hamilton Federal Number 1 is producing 55.8 gravity oil which is non-translucent, it is, obviously, has great physical differences than so-called distillate produced southwest of it. This particular well, Pubco Hamilton Federal Number 2 is producing 41.8 gravity oil. That oil is used currently by a large number of operators in sand frac process, because of its entirely different characteristics than distillate produced in surrounding areas.

Our company has concluded that since we are producing oil in this particular well associated with the gas and since we are producing distillate with entirely physical differences in characteristics of the liquid in this particular well, that the gas that we are producing with this oil is totally unconnected with gas that is produced with the distillate.

Q The summaries now or what you have just testified to, Mr. Gorham?

A In summary this cross section shows wells which are direct offsets, and although the general sand groupings are similar, the individual sands cannot be traced from one well to another. For conclusive proof that the wells are draining only, or less acreage than that assigned to the wells (320 acres), and that the sand reservoirs are not connected, we collected on the same date the non-retrograde

hydrocarbons produced in association with the Mesaverde gas. Although these wells have all been producing for approximately six months, all physical characteristics of the fluid produced are different. Core analyses and other reservoir data, other than gamma ray and neutron logs, are not available as the wells were completed in the accepted practice, with dry gas as a drilling fluid medium. Since detailed reservoir data is available on only rare instances throughout the entire field, I believe that the only conclusive and reliable function of recoverable reserves which all operators have at this time is the well potential or its capability to produce. Therefore, the proration formula should be entirely based upon this factor. It is quite possible that future well performance will supply additional valid reservoir data. At such time, the formula should be examined for possible modifications.

Q In order to clarify our position, can you state it in brief form, please summarize at this time, for the Commission, the facts which you have submitted?

A First, regionally the Mesaverde group is not a blanket sand, but a series of individual discontinuous sands interbedded with shales and coals within the Mancos shale.

Second, this transition can be easily noted within the limits of the Blanco Mesaverde Pool.

Third, different areas within the Blanco Mesaverde Pool have different recoverable gas reserves.

Fourth, initial potential, or deliverability, is the only valid reservoir characteristics in the Blanco Mesaverde field which

is generally known at this time, and which is directly related to the reserves under the well.

Fifth, there is apparently no drainage between wells as evidenced by dissimilar fluids produced with the associated gas.

Therefore, in my opinion, an equitable proration formula will reflect the recoverable reserves under each individual well-site, and such a formula at this time should be entirely based upon well deliverability.

MR. KELEHER: At this time we would like to offer in evidence before the Commission, Exhibits 1-A, 1-B, 2-A, 2-B and 3.

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

MR. KELEHER: That is all with this witness.

MR. SPURRIER: Does anyone have cross examination of Mr. Gorham? Mr. Weiderkehr?

MR. WIEDERKEHR: Mr. Weiderkehr, Southern Union Gas Company.

CROSS EXAMINATION

By MR. WEIDERKEHR:

Q Mr. Gorham, in your exhibit Number 2-A, I guess you have shown here a cross section, do you have a horizontal scale on this? In other words, is there a horizontal, are they scaled up horizontally, or are they just thrown in?

A They are put down with no particular horizontal scale, but there is a map of the particular cross section, showing the location of the particular wells on the cross section.

Q So, actually between Well Number 3, and what is this, 1) down here. Between this well and this well, it must be between these

two there is a considerable distance, is there not?

A That is correct.

Q Conversely between this well and this well and this well, (indicating), they are very close together, aren't they?

A That is true.

Q Were your temperature curves run prior to treatment --

A (Interrupting) These temperature surveys were all run at total depth prior to treatment.

Q So, actually they do not reflect where the gas might be coming from at this particular time, not necessarily?

A Yes, we believe they do because we have reliable information to the effect that other companies had run temperature surveys both before and after treatment and had found very little to no change.

Q That is information from other companies, that is not your personal knowledge?

A It is not my personal knowledge.

Q As a geologist, is it your opinion that you can't correlate this sand and this sand (indicating)?

A That is true.

Q You don't believe they are the same? They are not connected?

A I do not believe they are connected.

Q Are these wells on production?

A I believe that they should be on production.

Q Referring to your Exhibit Number 2-B, I note that you have

used two Southern Union wells to show that they are cased off below what we commonly call the Cliffhouse sand member and you make come various statements with regard to the possibility of productive gas within the upper interval. I might say that those wells do have gas. We drilled a lot of those wells with cable tools. There definitely is gas there. We admit there is water there and that we would prefer to complete in the lower member, eliminating the water problem. The wells, as you note, are low deliverability. One question I would like to ask is, did you look to see if you might find some wells in this same category with initial potentials of, say, three or four million, with only the Point Lookout, as we call it, open?

A Yes, we did. We examined the particular so-called Glade area with the idea of attempting to find wells that were completed only in the basal member, which were the closest wells to the two existing wells we have in the Glade area, where we have the entire section open. I believe you will agree that actually there is only a small number of wells in the Glade area which are completed with the entire section open today.

Q Right. What I was getting at, is it not a fact that there are wells in the Glade area completed with only this section open which have I. P. comparable to this ?

A It is possible. We chose to use these because they were the closest wells we could get to the existing wells. We could go from one side of the area to the other and show discrepancies. We felt

by using adjacent wells we would have a clear picture.

Q Didn't you further say that you had more reserve through here because you had a higher I. P.?

A I stated that we apparently had much higher reserves in those two particular wells as compared to the two operated by Southern Union, and that in association the deliverability was much higher and was indicative, or is indicative to me that the deliverability or the initial potential of the well is directly related to the reserves thereunder.

Q What if I had a well that was completed right here in this same section, with only the Point Lookout open, that has the same I. P. here then, would I have the same amount of gas that you do?

A I think it would be quite possible that if you did have an I. P. that was equivalent of higher than, undoubtedly you had high porosity, possibly less percent conate water than we did, which would add up to higher reserves. Therefore, higher deliverability.

Q You said porosity and conate water, do they have any effect on deliverability?

A Yes, they do.

Q To what extent?

A In that reserves, in my opinion, are directly related to initial potential and that the ability of the gas, the productivity of the gas will reflect the actual reserve situation. I would prefer, however, not to go into the true petroleum engineering fundamentals,

in that. We will have testimony in just a few moments on that.

Q One other thing. You mentioned 1/2 wells, did you say that the 1/2 wells are completed only in the Point Lookout?

A They are completed below the Cliffhouse member.

Q Below the Cliffhouse member?

A Someplace below the Menefee or on top of the Point Lookout.

Q On your Exhibit 3, did you have temperature logs on these wells?

A No, we did not. They were completed prior to the time that it was decided by the various members of the industry that temperature surveys could be of some value.

Q You don't know but what maybe these wells might have gas coming from a little different interval than these last wells over here, you don't have any idea as to where the gas is coming from from these four wells?

A The only thing we do know is that the gas is coming from below the casing point to the top of the Mancos shale.

Q There is no Mancos open in these two wells?

A It is questionable as to where we find the top of the Mancos. As I have attempted to point out, you will have a large amount of sand toward the base of it. We chose to believe that the top of the Mancos is an arbitrary point, and have not attempted to stress it here.

Q Isn't it knownthat the Mancos shale in this particular area carries crude oil?

A It has been rumored to that effect.

Q You don't know that to be a fact?

A No, we do not.. We have reason to believe that in some of our wells it is coming from the basal Menefee.

Q But, in these particular wells then, you don't, you wouldn't make a guess as to the fact that a good probability is that your oils might be coming from this area where you have apparently more of the shale area open there by giving you an area of production that would produce oil rather than gas condensate?

A No, because quite frankly we have no idea in the world as to where the crude oil petroleum is coming from, other than our idea that it is produced with indigenous gas.

Q You think it is produced, it is coming from what is known as the Mesaverde series?

A That is our belief.

Q In your first two exhibits here you attempted to prove that the Mesaverde sand was not a blanket sand and I think did very well in proving that over many, many miles it could not be, the sand was not continuous, or that various members of it could not be traced. I would like to get back here to this one a little bit, though, with regard to Exhibit 1-A. At the same time, I recall that under here you had the exposed sections from which you varied considerably between the top of the Cliffhouse and the Mancos shale. In this particular cross section, you have shown gas coming from two primary areas, have you not?

A That is correct, with the exception that a certain amount of gas in certain areas is being produced from an intermediate zone known as the Menefee, or with all three of them totaling the entire Mesaverde group.

Q Areyou familiar -- Let's go back one step. I believe you stated that you do not think there has been any drainage in the San Juan Basin, due to the fact that each well is producing from supposedly a different zone. You don't think there is cross drainage?

A The best information that our company has would indicate that no drainage is occuring at this time, and probably will not be seen.

Q Are you familiar with Pubco State Well No. 6?

A Yes, I am.

Q Do you know approximately what the original shut-in pressure was, 1114 pounds?

A How much?

Q 1114 pounds, according to the records in the Oil Conservation Commission on 8-12-'53 when you ran a deliverability the well shut-in was 1061. That is 53 pounds pressure drop. During that ensuing period of time, according to Oil Conservation Commission records, 1,000,000,397 feet of gas were produced. If my division is correct, that is 26,371,000 cubic feet of gas per pound of pressure drop. If I multiply the original pressure by this MCF per pound of pressure drop, I come out with a gas in place in Pubco State 6,

originally of 20,000,000,000 feet of gas, which on 320 acre unit is 91,500,000 cubic feet per acre. Do you in your reserve working figure that you have, have 91,500,000 cubic feet of gas in place under your 320 acres under your Pubco State 6?

A As a matter of fact, I am not too sure of that particular well, as to the total amount of reservesunder that well. However, within the Blanco-Mesaverde Pool we have shown as high as 30 to 1 ratio in recovery of gas per acre within the Blanco-Mesaverde Pool.

Q Recovery of 30 to 1 per acre. What do you mean by that exactly?

A Well, the reservesin our opinion are directly reflected by the initial oper flow of the deliverability, or the capability of the well to produce.

Q Well, I am going to take exception to that, of course, in that I think the reserves are based on the amount of gas you have in place and not with the I. P. You are saying that there is a 30 to 1 difference in I. P. then actually, not a 30 to 1 difference between actual reserves in place?

A Quite frankly I would prefer that you would postpone these petroleum engineering questions to the engineer who will follow in our testimony.

MR. MEIDERHOHR: Very well, thank you.

MR. SPURRIER: Anyone else have a question of Mr. Gorham?

By MR. SMITH:

Q Have any interference tests been run by your company with

respect to the pressures that exist from one well to another?

A I am not prepared to answer that.

Q Is your succeeding witness--

A (Interrupting) As a matter of fact, I do have before me two wells, Pubco State Number 12 in the southwest quarter of Section 36, Township 29,8; Pubco State Number 13 in the northeast quarter of Section 36, Township 29, 8 which are diagonal offsets. The initial potential of State 12 was 3,400,000. The initial potential of State 12 was 3,400,000; the initial potential of State 13 was 3,210,000. The initial shut-in pressure on the first well taken after 14 days, State 12, was 1017 pounds; State 13 was 986 pounds after 11 days. After 120 days -- Incidentally, the reason we have this shut-in period is that there was sometime before it was possible to put these wells on the pipeline; as a consequence, we were able to get in shut-in pressures over a rather long period of time. After 120 days, State 14 had a shut-in pressure of 1,100 pounds-- State 12 did; State 13 had 1,077 pounds. After 180 days for the State 12 it remained at 1,100 pounds, and State 13 had 1,079 pounds, showing that although those wells were shut-in for a period of 120 to 180 days, that pressures did not equalize, although they were on offset wells and that the change, the difference in pressure is quite obviously due to the reservoir characteristics.

Q Are those your surface pressures or bottom hole pressures?

A Those are surface.

Q There is some origin of error on your surface pressures with respect to what the bottom hole pressure would be. They would

vary your atmospheric conditions?

A That is true.

Q There is a close comparison, however, from a standpoint of possibility of the bottom hole pressure having equalized?

A That is right.

Q Will one of your succeeding witnesses have information on the respective pressures in these wells that you have shown by Exhibits?

A I believe that information may be available, I am not positive.

Q You don't have the information yourself?

A No, I do not.

MR. SPURRIER: We will take a short recess.

(Recess.)

MR. GREINER: I would like to ask a few more questions on behalf of Southern Union.

By MR. GREINER:

Q Referring to your Exhibit 2-A, Mr. Gorham, and the wells there indicated, do you have any data as to the deliverability from those wells?

A They are available in the company files. It is quite possible they will be presented later. I do not have them with me here.

Q As I understand it you are using this Exhibit as part of your rationalizing that deliverability is the key test. I

am just wondering how it happens that the matter of deliverability in these wells is so unimportant that you haven't concerned yourself with those deliverabilities to see whether it did or did not fit in with the propriety of the formula that you were suggesting? It seems to me if you are going to base it on deliverability data we ought to know something about the deliverability of the wells you are basing your philosophy on.

A The particular Exhibit that we used to stress that particular point on was Exhibit 2-B. Exhibit 2-A was an attempt to point out to the Commission that although you have the general sand groupings of the Cliffhouse, Menefee and Point Lookout, that the superimposed temperature survey would indicate that gas is coming from specific sands within that overall sand group and that one well will vary from one well to another by apparent reserves on the basis that individual sands are contributing gas and that those individual sands are not necessarily easily traceable in the area.

Q Well, I understand that. Maybe I just don't follow your chain of logic, but somehow or other you get from that to the proposition that the sands aren't traceable and therefore, that deliverability is the sole and only test, and we haven't seen any studies yet on what the deliverability of these wells are with relationship to their probable reserves or feet of productive sand, and I am wondering whether you or this engineer witness who is going to follow you does have any information along those lines at all?

A Yes, we will have additional evidence. However, I would like to point out that we have put on that particular exhibit, the

initial potential, which by experience has shown us the deliverability in most instances, I believe, is proportional to the initial potential or roughly 20 percent of the initial potential.

Q It is on this, just general thought, that there is a rough relationship there that you go from initial potentials to deliverability?

A That is not a rough estimate, because I believe that the sub-committee working on this problem have agreed that in the absence of deliverability that 20 to 22 percent of the intiial potential is close enough to be used as a deliverability in the formula and until such time as deliverability is actually taken.

MR. GREINER: That is all.

MR. SPURRIER: Anyone else have a question of Mr. Gorham?

MR. ARNOLD: Emery Arnold with Oil Conservation Commission.

By MR. ARNOLD:

Q I understood you to testify that each separate drill block in your opinion was a separate reservoir without any communication with the offset reservoir?

A I am not quite sure of the record on that. The intention I had was to state that as far as we are able to determine there is no communication between wells and that the individual sands are very difficult to trace from one well to another and in most instances they cannot be traced.

Q What then is your theory as to how the gas got into the drill block originally?

A Well, I believe that you are talking about the source of Mesaverde gas.

Q Yes.

A That, as we all know, is a highly argumentative subject, but I believe the very nature of the depth situation of the Mesaverde group, which is a near shore depth situation, in some cases continental and in some cases marine, that in all probability the gas was generally associated directly with the reservoir that the interstitial shales and coals probably contributed the majority of gas to the overall Mesaverde group.

Q You think that the gas originated in place in each drill block?

A I have no reason to believe to the contrary.

MR. ARNOLD: That is all.

MR. SPURRIER: Anyone else?

MR. UTZ: Elvis Utz, Oil Conservation Commission.

By MR. UTZ:

Q Mr. Gorham, do you have a reserve figure of your own for your State Number 6?

A I don't believe I do here.

Q You have never computed that reserve at all?

A That has been computed.

Q Do you recall about what it is per acre, or for a 320 acre drilling block?

A A consulting geologist has been used at various times for Pubco in order to determine reserves, as a disinterested party. He

has, to the best of my knowledge, used over a hundred million cubic feet per acre on that particular well. Such belief, as I understand it, was accepted by high authority.

Q Do you happen to know what kind of porosity or conate water you used in your core analysis?

A That well was not cored because at that time we were using gas as a drilling fluid medium, and the actual usage of gas would prohibit the coring process. As a consequence the cores were not taken.

Q Can you tell me what your interpretation of the net pay is in that well?

A The net sand thickness?

Q Well, the part of the open well bore that is producing gas that you consider net pay?

A That is of Pubco State Number 6.

Q That is right, yes, sir.

A I do not have that particular specific well. However, in my opinion, as I recall, it probably is in excess of 400 feet of effective net sand.

Q Total Mesaverde section is what?

A The effective net sand in the overall Mesaverde group, Cliffhouse, Menefee and Point Lookout, all of which we believe to be effective net sand, exceeded 400 feet.

By MR. ARNOLD:

Q What basis did you use to determine what was net sand?

A Well, the only basis that we had to go on, other than the gamma ray neutron log was the mere fact that an offset well to the southwest, Turner State 1, set pipe on the base of the Luis or the top of the Cliffhouse, and in the completion process of drilling in with gas there was a very very gradual increase of gas to the point of 20,000,000 -- I believe that was 23,500,000, is that correct? -- 20,300,000 on top of the Point Lookout. In fact the well was making so much gas naturally that it was impossible to finish the completion of the well through the so-called basal member. As a consequence, we feel that in that particular area the massive sand built up in the Menefee is very definitely contributing gas to the well bore.

Q Have you ever constructed a log cross section across the Turner State to see if the sand section does show?

A We have not exactly prepared a cross section, but have superimposed the gamma ray neutron log of Turner State 1 directly on top of the State 6 well, and have shown physical characteristics that very definitely compare.

Q Was there a log run on the Turner State Number 1 itself?

A I am not quite sure of that point. I believe there was, there might not have been.

Q I don't believe there was, it was making so much gas they couldn't get the log down.

MR. SPURRIER: Does anyone else have a question of Mr. Gorham?

BY MR. FOSTER:

Q What do you regard the efficient and economic drainage area of a gas well in this Blanco Pool?

A As far as I can determine, it is possibly less than 320 acres.

Q How much less?

A I have no idea.

MR. FOSTER: That is all.

MR. SPURRIER: Anyone else? If no further questions --

MR. SELINGER: I would like to ask one.

By MR. SELINGER:

Q I understood you to say on direct examination, Mr. Gorham, in your qualifications, that you have been with Pubco, Incorporated since its inception, is that correct?

A That is correct.

Q How many years has that been?

A Since June 4th of 1951.

Q 1951?

A That is correct.

Q At that time were there any wells in the Mesaverde field?

A There were.

Q Did Pubco have any wells in that field?

A Not at the time.

Q Does Pubco, Incorporated operate any gas properties under proration?

A They do not.

Q We don't have proration in this field now, is that true?

A I believe that we have what you might consider a pipeline proration.

Q I will rephrase my question. We don't have any proration by the State in this field at this time?

A No, sir.

Q We are meeting here for the purpose of determining rules and regulations for such proration, from here on out, is that correct?

A That is true. However, I believe it is subject to appeal and subject to modification as additional reservoir data is obtained.

Q Initially we are here for proration purposes, is that correct?

A That is correct.

Q Since you do not have any experience in proration of gas on what do you base your statement that the allocation formula should include deliverability?

A Because I believe that it is generally accepted that a proration formula, as per your company's testimony, also should evolve around the reserves under the particular well.

Q That is a conclusion, but on what experience do you base your conclusion, that is what I am trying to get, not your opinion but your experience of proration of gas. On what do you base your conclusion. I know your conclusion all right, but I want to know on what you base your, what experience do you have to base your

conclusion?

A Well, the only experience I have is three full years of working in the Blanco-Mesaverde Pool proper, following very closely all operations up there and while on the actual wells, have come to what I consider to be logical conclusions in regard to the reserves under those wells.

Q And, hence, you have come up with the conclusion that deliverability is the best reflection of reserves, is that correct?

A That is my opinion.

Q How do you determine, how do you go about determining reserves under a well, under a lease, under a pool? I will give you your chance later.

A I would prefer not to answer that question in that that is primarily a petroleum engineering function, although the geological department contributes information towards the end.

Q Although you prefer your engineers testifying, you did present your Exhibit 2-B in which you came up with a conclusion that the two wells on the right had better reserves than the two wells on the left?

A Don't you agree?

Q I am asking you. I will let you make your comments as you wish, but you have come up with the conclusion that the two wells on the right have better reserves than the two wells on the left?

A That is correct.

Q How much reserve do you estimate for those two wells?

A The exact figures for those four wells are not available. We have attempted --

Q (Interrupting) I am just asking about your two wells on the right, are those your two wells?

A Those are our two wells on the right.

Q Have you estimated the reserves under those two wells?

A The reserve estimate has been made of those two wells and in so doing we included the upper sand section of the Mesaverde group, commonly called the Cliffhouse.

Q What are the reserves under those two wells, if you know?

A The particular figure under those particular wells at this time are not available to me.

Q Do you, or do you not know the reserves under those two wells? Can you give us a specific figure?

A Not at this time.

Q You are not prepared at this time to give the reserves, but you are prepared to give us the conclusion that the reserves under the two right hand wells are larger than the reserves under the two wells on the left?

A I am in that position to say so, yes.

Q Since you brought up the question of reserves, how do you go about determining reserves of a well?

A Well, there are several methods by which that can be determined.

Q Name them.

A The first one is the volumetric method which has been generally in usage in the Blanco-Mesaverde Pool because almost all of the data available for such an estimate is available. Other methods which would include decline curves have not been used, or should not be used because the field is relatively new.

Q Would you kindly explain what you mean by the volumetric method of determining the reserves?

A The volumetric method of determining reserves involve the following data and the following formula: Cubic feet of gas per acre foot at base temperature and pressure equals 43,560, which is the number of cubic feet per acre foot times the porosity expressed as a decimal fraction, times one, minus interstitial water, expressed as a decimal fraction in parenthesis, times the reservoir pressure in pounds per square inch absolute, divided by the base pressure pounds per square inch absolute, times 460, plus the base temperature degrees fahrenheit divided by 460, plus the reservoir temperature degrees fahrenheit, times one over the compressibility factor at pressure of the reservoir.

Q In other words, in the volumetric method you have used a pressure three times, have you not, in your calculation?

A I am not too sure.

Q Well, Mr. Gorham, let me ask you this before you answer that question. What are you reading from, a prepared statement?

A Yes, I am.

Q Now, can you answer that question as to how many times you used pressure in your calculation on the volumetric method?

A It has been used twice.

Q That is one method. Now, what is the second method before you use that method, because you lack production history on this new field before we get or to that?

A That is correct.

Q What is the second method?

A This is the only method we have used.

Q You said there were several. What other methods are there available for calculation of reserves, if you know?

A Well, --

Q (Interrupting) If you don't we will pass on to the engineer.

A Well, first of all there is the decline curve method which was just previously mentioned.

Q What is the decline curve method?

MR. TURNER: We are going to object to that line of testimony, Mr. Chairman, that brings in collateral issues. The witness has testified over and over again and to go into what the decline curve method is and all that before an expert body such as this, is just time consuming.

MR. SELINGER: It isn't time consuming. If the Commission please, the man has testified as to the reserves. I am going to ask him what methods there are of determining such reserves, and what method he used, what methods are available.

MR. TURNER: He told you what method he used. You are

asking him to explain something now from a book somewhere.

MR. SELINGER: I would rather have him read it from the book.

MR. SPURRIER: Objection overruled.

Q Will you kindly explain then the second method of determining reserves, which you said our witness had testified before?

A Well, the second method would involve pressure decline versus volume of gas produced.

Q That is used, is it not, Mr. Gorham, in a field where you have production history? Is that correct?

A That is correct.

Q Which of the two methods are superior in determining more accurately the reserves?

A I believe it is generally concluded that the latter method is.

Q Should the field have sufficient production history behind it, would you be agreeable to utilizing the second preferable method rather than the first?

A I think it should be very carefully considered.

Q In the second method you use pressure decline, do you not?

A Yes.

Q Plotted against accumulated production?

A That is correct.

Q In no instance in that second superior method so you use deliverability in any way, shape or form?

A Well, I am not quite sure of that point. It is quite

possible that deliverability definitely enters in as a function.

Q If you are not sure I will defer that question to the engineer.

A Thank you.

MR. SELINGER: That is all.

MR. SPURRIER: Anyone else have a question of Mr. Gorham? If not the witness may be excused.

(Witness excused.)

D. W. R E E V E S ,

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

DIRECT EXAMINATION

By MR. KELEHER:

Q State your name.

A D. W. Reeves.

Q What official position, if any, do you occupy with the Pubco Development, Incorporated?

A President of the company.

Q For what length of time have you been president?

A Since its organization in June, 1951.

Q Since the date of the organization of this company, have you personally managed it in the field, directed it?

A Yes, sir, I have personally discharged the duties of president and directed its operations.

Q What, if any, degree do you have in engineering, and from what school?

A I have two degrees from New Mexico A and M State College, One, a BS in engineering, the other a professional degree in electrical engineering and am registered as a professional engineer in the State of Texas, Oklahoma, New Mexico.

Q State to the Commission the experience you have had in the oil and gas fields in New Mexico and elsewhere.

A Well, my first experience was a production engineer for the Union Sulphur Company, at the time we were operating about 18 rigs in Louisiana, a number of years ago. Then I served for about three or four years as a member of the Committee passing on oil and gas leases and drilling, for Oklahoma Natural Gas Company in Tulsa. Since that time, of course, with Pubco.

Q Are you personally familiar, to a considerable extent, with the problems pertaining to the proration of gas in the Blanco-Mesaverde field of San Juan County, New Mexico?

A Yes, I think I am.

Q Have you had occasion to make a study of the possible variation of recoverable reserves on 320 acre Mesaverde leases in Blanco-Mesaverde field?

A Yes, sir, I have made a study to determine the possible variations and recoverable reserves on 320 acre Mesaverde leases. The study is general in its character, but indicates the possible variation between a minimum well and a maximum well in my opinion.

Q Would you say that gross sand thickness is one factor that properly pertains to that study?

A Yes, sir. I have prepared a statement here in which I

deal with all the matters which I consider is involved in determining the reserves under the 320 acres, and attempt to find out what the variation possible is.

Q Would you please discuss the various problems referring to your memorandum, from time to time, if you so desire?

A In order to be accurate in what I say and be sure that I don't make any error, I am going to stick pretty close to this prepared statement.

Grosssand and thickness exposed to the well bore varies from about 100 feet minimum for wells which are productive only from the Point Lookout to some 450 feet in better areas of the field where the Cliffhouse, Menefee, and Point Lookout are all productive. In the northeastern part of the field, the entire Mesaverde sand group is poorly developed. It is therefore evident that reserves can vary in the order of 4.5 to 1, taking into account only gross sand available.

Porosity, of course, is important. Previously Mr. Gorham, Chief Geologist for Pubco, has submitted data in support of his opinion that the Mesaverde group consists of numerous interbedded sands and shales, the individual sands of which cannot be traced with any certainty from well to well and which vary greatly in thickness and characteristics. In some areas sands are relatively clean and others contain a large percentage of shaly materials.

It has been my observation on the few wells that have been cored, and information received from other operators in the same field indicates that porosities of individual sands vary from below

4.6 percent to above 15.4. The use of gas for drilling in wells at the time the large wells were completed prevented coring of any of those wells. Thus information on porosity is lacking on the better wells. Information in our possession indicates that porosities in the Mesaverde can run as high as 28.4 percent, and with this data in mind, it is my opinion that the porosities in the better wells will average at least 20 percent. It is, therefore, evident that reservoir capacity due to variations in porosity will vary in the ratio of 4.35 to 1.

Connate water also has something to do with it.. The percentage of pore space occupied by connate water in productive Mesaverde wells varies from 20 percent to 60 percent, or the percentage of pore space occupied by gas is from 40 to 80 percent. This would indicate possible variation in reservoir capacity due to connate water of 2 to 1.

The initial shut-in pressures on wells completed by Pubco in this field vary from 933 to 1102 pounds per square inch gauge. This would indicate a variation in reserves in place in the ratio of 1.18 to 1, neglecting the supercompressibility factor. This variation also supports the contention that well is producing gas from a separate reservoir, separate at least to all practical purposes.

Summarizing those factors, we find that the reserves under any given lease can vary in the ratio of 46.4 to 1. I want to be sure that I am clear in that. In other words, your sand thickness can vary 4.3 to 1, your porosity 4.35 to 1, Your

reservoir pressure or your connate water, 2 to 1, again a multiplier. Your reservoir pressure, 1.18 to 1 and the product of those is 46.4 to one.

My conclusion, and I think that most proration orders, in fact the basic idea behind proration is that it must be on the basic concept that each operator is entitled to the same percentage of the market as the operator's gas reserves are of the total reserves involved. Now, the question is to find a proration formula which will achieve this result. It is my opinion that deliverability is a measure of the gas reserve under each well. Deliverability of initial potential are the only known and incontestable facts which are available over the entire field and which reflect all of the factors, sand thickness, porosity, permeability, and other reservoir characteristics under uniform spacing.

It is our belief, therefore, and mine, that the formula should be based upon deliverability times acreage and that this will result in each well sharing in the market in proportion to the reserves underlying the well. Using acreage as a multiplier will correct for certain minor deviations from the uniform spacing pattern.

It has been shown that it is possible for gas reserves to vary in the ratio of 46 to 1. The variation of initial open flow potential, and here I am taking, as a base, what I consider to be not a commercial well, but marginal about the deliverability of the minimum factors that I have talked about of 750,000 MCF,

initial potential, if you want it in deliverability, apply your factor of 20 percent. The highest well that I know of on the initial potential is 23,500 MCF. That is a ratio of 31.3 to 1 as compared to a possible variation of 46 to 1, if in some area you got all of the favorable factors, as we apparently have in the larger wells.

Let me again reiterate that in my opinion, the formula of deliverability times acreage is reasonable and will result in each well being allocated market proportional to recoverable reserves under each well.

Q Mr. Reeves, do you consider acreage alone or as an additive factor?

A Well, sir, if the Commission will bear with me I would like to go into that in some detail. In other words, first of all if we take 100 percent acreage, that means that we totally disregard any difference in reserves between various areas of the field and if that is done it violates the basic concept that the operator is entitled to a market in proportion to his reserves.

Another way of looking at an acreage proration, the best acreage in the field, which is obviously, some of it is better than another, is worth the same as the poorest acreage in the field.

The next point that I would like to make is, that to use acreage, if you used 100 percent, then all wells have the same and quite obviously don't have a deliverability quite as high as their allowable under an acreage factor. We bring it back to 50 percent acreage and 50 percent deliverability and we are committing only half the crime. We bring it down to a quarter and we are taking a quarter off.

The other point is that, that is, I have touched on it there. That is, if we adopt an acreage formula of 25 percent, even that small, that then you have a number of wells in the field in which you have an allowable above their deliverability or their capability of delivering and thus put into effect a proration formula which in the end isn't workable and you have to reallocate the gas that the small wells couldn't produce. On the other hand, the deliverability times the acreage is fairly, it allocates the reduction to everybody and doesn't load it on the better wells.

Q So, you take your stand on behalf of Pubco and your professional opinion that the formula deliverability times acreage is reasonable and should be the formula used?

A I do, and I would like to again point out that deliverability or initial potential, and it would be more or less interchangeable, are the only factors that we have without question available for every well in the Blanco-Mesaverde field. It is the only one factor we have available for every well.

Q Were you here this morning at the session, Mr. Reeves, and did you hear Mr. J. D. Cooper of Skelly testify?

A Yes, sir.

Q What, if any, comment do you wish to make on the formula that he recommended on behalf of Skelly?

A Well, if you took your rock pressures after a 7 day period, 14 day period or 30 day period or 60 day period, you would get an entirely different result on the formula. To me, acreage times pressure is another way of saying acreage proration with modifi-

cations.

MR. KELLAHER: That is all with this witness.

MR. SPURRIER: Does anyone have a question of Mr. Reeves.

CROSS EXAMINATION

By MR. SMITH:

Q Mr. Reeves, Mr. Gorham testified awhile ago about his lack of knowledge of the respective pressures, except in two instances. On the two instances, I think he stated on certain periods of shut-in, that the wells were shut-in, that there was not appreciable building up of pressure in the well which had a lower pressure. I think it did gain two pounds. I would like to ask if you know whether or not there has been a marked differential in pressures from well to well, to the various locations that you are familiar with?

A You mean initial pressures?

Q Initial potential, and then I would like to know, after production, if you show any marked dissimilarity?

A I might refer to -- First of all I don't know that I am directly answering your question. You referred to Pubco State No. 12 and Pubco State 13, the offset wells, around that we have a list of nine wells in a general area around those that were producing for a period of 180 days, while these two wells were shut-in due to failure to get connection. We didn't take the tests for the purpose of that. It does illustrate, during that period we had these other wells producing here, these two wells in the center of the area, the initial shut-in pressure was 1100 pounds, after 180 days the

tubing pressure was 1,080 on Pubco State 12, 1078 tubing pressure at the end of 7[illegible] days. Pubco State 13 was 1,060 as against 1,064, both tubing pressures. I would be inclined to say that any variation there was due to errors in the taking of the pressure.

Q Atmospheric conditions?

A Which indicates very little drainage under the conditions existing.

Q The nine wells producing, do you have figures on what decline in pressures occurred in those wells?

A No, sir, I have not. I have not.

Q They could, very easily, be roughly equivalent. In other words, you could have produced the amount of gas you did produce with perhaps only two or three pounds drop of pressure in that time?

A I wouldn't dare attempt to guess the answer. I wasn't thinking in angles of reducing pressure on those nine offset wells. I was thinking more of the point that this showed that the offset wells being produced, while the others were closed, in Pubco State 13 was only 120 days. All I wanted to show was that it didn't pull down the pressure on those wells, indicating little if any migration to the offset wells.

Q The testimony of Mr. Gorham indicates that he considered each 320 acres of assigned acreage to each well to be separate and independent reservoirs. Is it your opinion that those facts do actually exist?

A It is my opinion that you can take any set of sands here and trace them through all of these wells. Now, I think that you

will probably find one sand maybe that you, maybe it is in two or three wells, but to all intents and purposes they are separate. Now, undoubtedly, some of those sands do overlap. It would be a rare thing if there wasn't some overlapping.

Q Where would be some communication that would result in communication throughout the entire field, but imbedded by reason of your lenticular condition?

A That is right. My point is, to all practical purposes there is no drainage existing at the present time as between wells.

Q In other words, there is probably communication, but it takes a longer period of time for the pressures to equalize than would be the case if there were one continuous sand of equal porosity and permeability?

A That is right. Another thing that possibly would illustrate what I mean, I think there is varying resistance between flow in different locations. For instance, we have in certain parts of the field up there and I think maybe it is actually several fields, 933 pounds initial potential, as against, I believe, 1144. I had 1102 as a maximum, which would indicate even of the acreages, that field hasn't entirely equalized as between it, and there is no communication of any majority. Now, possibly you will find points of some intercommunication, but, in other words, I don't think that any of us can say now that one sand may not overlap between two or three wells, but fieldwise, no, and not all of the sands. I can visualize that as a lot of lenticular reservoirs.

Q In your opinion, then, as far as the Mesaverde formation in the Blanco field is concerned, it is a common source of supply?

A The Mesaverde section as a whole furnishes it, yet there are numerous small interbedded sands in there contributing to one well. Maybe the one sand doesn't contribute to any other well. We can't tell. We know that we are getting gas in the individual wells. The evidence we have indicates very little communication.

Q You would say there is some communication throughout the entire field?

A I would not, not the entire field, but I would say between areas of it. In other words I have in mind, looking at Skelly's Exhibit 2 this morning, to me it looked like there was possibly three fields connected by some very relatively impervious sands. In other words, to me that substantiated our conclusions that it is a lot of little reservoirs with comparatively little minor connections in between them.

Q It is not your recommendation that you draw a fence between each 320 acre unit and call it a reservoir?

A No, sir. I made a crack in one of the -- I stated that we build a cast-iron 320 and there wasn't going to be any gas get in or out. Somebody took me seriously. Suppose you got a lenticular, the tail-end of it may be on somebody else's lease, the tail end of his sand may be on yours, but there is not enough connection to allow drainage as proven by these figures here of a general condition of the field.

Q Of course, all your statements in addition to your lenticular condition, is colored by the fact that there is a variance of porosity throughout the entire field?

A Yes, sir, very much.

Q The reason I asked you about the common source of supply is to get before the Commission, since it is their duty under the statute to regulate each source of supply separately. I asked you in your opinion, if that condition did exist, wouldn't it be possible for the purchasing company to make a nomination for each well and have the entire field prorated, well by well?

A I think you could argue the point that each one of those constitutes a little separate reservoir. On the other hand, from a practical standpoint I think you have got to arrive at some point that will give some indications of the reserves under each one of the leases, base the formula on that and I think you will get fair and reasonable results by considering it all as one field. I don't think that certainly, for practical purposes that this 1114 pounds, down here (indicating) and the 913 pound initial potential well is, by any means, interconnected or over the ages that pressure would have been equalized. The difference in depth, if it was a common reservoir, still doesn't account for the difference in pressure. There is some variation. Maybe the one over the 933 is leaking a little, but not fast enough to maintain it.

MR. SMITH: Thank you very much, Mr. Reeves.

MR. SPURRIER: Does anyone else have a question of Mr. Reeves.

MR. JONES: Trevor Rees Jones, representing Delhi Oil Corporation.

By MR. JONES:

Q I was interested in your testimony concerning the wide variation in recoverable reserves. I believe you compare variations in porosity, reservoir pressure, connate water and sand thickness?

A Yes.

Q I believe your result was there could be a variation of 46 to 1?

A That is right.

Q Would you illustrate very briefly for me, by an example, perhaps, how you would reach that?

A With the Commission's permission I would like to make a mark or two on Exhibit 2-B on the side. This has nothing to do with it, This is a cross section with a 320 acre site. I said that the total depth varied from 450 feet, that is gross sand, to 100 feet. I said that the ratio was 4.5 to 1, so I am going to adjust -- that looks like it ought to be about the proper place, so there is one 320 acres and then a hundred feet of gross sand section. Here is another 320 acres, 450 feet of gross sand section.

Now, it is quite obvious that you can have, at the same pressure, same porosity, same what have you, four and a half times as much gas in this big 320 acre block as you can in this little thin one.

Going a step further, the next thing I mentioned was porosity. It so happens, still sticking to our reservoirs, that this little block here (indicating) is 80 percent, that was 4.6, that there is only about, there is 93.4 of this filled up with sand in here. Now

then, and the same thing would hold down here -- if we put more porosity, more holes in the sand, if you please, up to 20 percent, you would come up with 4.39 times as much gas in that reservoir then. In other words, if the porosity is greater, you get twice as many holes in one as in the other, you got twice as much gas, if your block is four and a half times its product.

The next point I made is connate water. If some of the pore space gets filled up 60 percent with water there is only 40 percent of space left for gas. Likewise, if you have only 20 percent filled with water you would have 80 percent left for gas. So that you would have twice as much on connate water.

The reservoir pressure is simply Boyle's Law, taking one of the boxes that you want and if you put a pressure gauge of 1,002 pounds gauge on it and another box the same size, with a 933 pound pressure gauge, you end up with 1.1 to 1 more gas in the box with the higher pressure. Of course those are all cummulative, they are multiples. You multiply all of the possible things together which exist in some sands in the Basin. You can get any combination of them, you can come up with 46 times the amount of gas.

Q I see, in the ideal location, which had all the --

A (Interrupting) The low connate water, the high sand thickness, all in one well. You could have 46 times as much as I think the minimum, which would be 750, yet we haven't got but 31.3 to 1.

Q In other words, --

A (Interrupting) In other words, the point I am trying to

make, Mr. Jones, is simply this, that from what we know of the individual sands in that Basin, from the fact that they vary widely from one end of the basin to the other, that you can get any combination of the factors you want. When we get a well with 23,500,000, it is not unreasonable because you could get a nice favorable set of sands, nice water conditions, nice porosity.

Q The prior witness gave a definition of the volumetric method of determining reserves. As I remember that, the method included the various things you talk about, connate water, sand thickness -- I don't believe you included compressability, I am not familiar with it.

A That is a little devil of a factor that gets into an engineering argument.

Q I wonder if you are considering the very things you have considered here in reaching your 46. to one result?

A That is right. The factors that I have taken and considered here are the factors that you use in computing volumetric estimate of reserves.

Q And is it correct to say that those factors are factors which are considered when you are talking about deliverability, are they functions of deliverability?

A They all go up to make deliverability. I concur with the Kansas Commission in their statement on the Hugoton field, in which they said that notwithstanding, there was no argument about it being a common reservoir, it was a common reservoir. They made the statement that deliverability constituted the best measure. I have the

book letter here if it would be of any help to read their conclusions. We have a separate reservoir up here (indicating). It is different from any I know anywhere else.

The mere fact that there is 150 fields in Texas that are prorated on an acreage basis, and only two on acreage times deliverability proves one thing to me, that acreage formula didn't fit the other two fields, and is the reason the Commission changed it and went to deliverability times acreage. In other words, we have a condition up here in this field and I don't think there is another one like it in the United States. I could be wrong.

We have got to take the facts on this Basin as they exist and arrive at the formula that does. What gives each man market in proration to his reserves and the only measure of reserves that we have is deliverability, that is the only measure that we have that is applicable to every well in the field.

MR. SPURRIER: Anyone else have a question of Mr. Reeves? Mr. Foster?

By MR. FOSTER:

Q Mr. Reeves, is it your contention that these large capacity wells won't drain gas from other areas?

A It is my contention, Mr. Foster, that they are not. It is my contention that, taking into account the various factors that go to make up reserves, it is perfectly possible that they have 46.4 times as much gas under those wells as the well with 750,000 I. P.

Q Then it would also be your contention, would it not, that

the low capacity wells couldn't possibly drain the large capacity wells?

A If you shut in the high capacity wells and you produce the low capacity wells, you lower the market, that is what is concerning me, no matter whether they are draining or not.

Q I understand. I am talking about drainage.

A I am not talking about the drainage of the little wells, I am talking about taking the gas from the field and giving it to marginal wells.

Q If the little wells aren't going to drain any gas, how are you going to take the gas away and give them to the bigger wells?

A Let's say that we make it 100 percent acreage and it so happens that is an average of 200,000 MCF per day. We make it average so all of the wells produce 200,000 per day. Where is the market for your wells that will make 10,000,000 deliverability?

Q I am not talking about market, I am talking about drainage.

A I am not worried about drainage, I am worried about market. I am worrying abour market proportion to the reserves under those wells.

Q I appreciate what you are worried about. The problem that we have is to design a formula, as I understand it, that will most nearly keep in proper relationship the factors that are indicative of reserves in place. That is a correct statement, isn't it?

A If I understood you, Mr. Foster, and I think I did. May I repeat to be sure I understood?

Q Yes.

A You said your problem is to determine --

Q (Interrupting) That is the problem before the Commission.

A Let me see if I understood you. Our problem is to develop a formula that will enable each well to market gas proportionally to the gas reserves attributed to that well. Is that what you said?

Q No, I didn't use the term "market".

A Produce then, allowable.

Q What I understand our problem to be is to keep the factors of reserve in such relationship so that each well will be permitted to produce in the proportion that its reserve bears to all the reserves in the field.

A I think that is exactly what I said, except I said market instead of produce.

Q All right. If the little wells can't drain the big ones and the big ones can't drain the little ones, it doesn't make much difference what kind of a formula you have, does it?

A Oh, yes, it does.

Q Why?

A Oh, yes, it does, I wish I had a blackboard. All right, then, suppose each well had 300,000, that is average. In other words, we are going to take full acreage for illustration to answer your question. So 300 is all you can make, that is the allowable because it is on an acreage basis and that provides up to that. So what do your wells capable of producing get, they get 300. What does the little guy get with 300, he gets the full capacity, not with

any relation to the reserves. This guy is producing the 300,000 with nominal reserves. The fellow with no reserves at all is trying to produce his 300,000. I said 46 to 4 is possible and he is producing the same as the other. Where is the ratio and where is the proportioning of reserves on that kind of thing?

Q I am producing my well on one tract and you are producing on another tract, and regardless of the rate at which we produce the wells, I don't get any of your gas and you don't get any of mine. What else have you got for a formula?

A That if we spend $85,000.00 on a hole in the ground and we complete a well with reserves sufficient to justify it, that we want to sell that gas and get some of that $85.000.00 back. The other guy over here with a well that can't produce it. Hell, there is a dry hole at the beginning, he should abandon.

Q You are talking about rates of production and not reserve?

A Oh, yes, I am talking about reserves. I am talking about the guy over here with the low deliverability hasn't got the reserves that the high deliverability well has. I think I have demonstrated the possibility of that by going through the facts or the factors that go into make up the reserves.

Q You are talking about this ideal situation where you finally arrived at this 46.4 to 1 variation? What odds do you think that there would be that you would find that ideal condition?

A So far as there is 704 wells in the Field and no one has hit the 46.4 to 1 yet, the odds are pretty bad that you are going to get ideal conditions in all of them. You can get good conditions

under given conditions, with increased reserves.

Q In the method of completing your wells there in the field, you shot them or acidized them?

A We have generally shot our wells, yes, sir, drilled in with gas and shot.

Q Do you increase their deliverability by that practice?

A Yes, certainly.

Q Does that increase the reserves?

A I think it is a measure of reserves with a few exceptions where you have got --

Q (Interrupting) Shooting a well don't put any more gas down there, does it?

A No, but it opens up more holes for the gas to flow into. All of your wells are opened up for it to flow into. In other words, this well here was probably shot with a pretty good charge, but it didn't open it up, it didn't have any gas there.

Q You testified, as I understand you, that deliverability is directly proportional to reserves?

A It is the best measure, it is the best measure of reserve under a given well that we have at the present time, and the results, , using that give ratios lower than possible theoretically.

Q Well, I don't agree with you that is the best measure. I do agree with your statement that it is the only common denominator that we now have actual knowledge of, that we can apply to the various wells in the field.

A That is right.

Q What I am getting at is that it doesn't follow from that, that reserves are directly proportional to the deliverability, does it?

A Mr. Foster, I would say that it is the only thing that we have, the only common denominator which is approximately right, and you and I could argue the matter of degree.

Q I am not arguing with you at all. I agree with you it is the only common denominator. It is the only thing we can see to apply to these wells.

A As to the degree that it follows the proportional.

Q I am saying that it doesn't follow from that fact, although you apparently contend that it does, that reserves are directly proportional to the deliverability?

A Mr. Foster, I would say this, that theoretically taking the variations in sand thickness, the porosity, connate water and pressures, that it indicates that on the ideal you could have a much higher ratio with favorable conditions than you have got actually with wells in the field. That is the point I am contending, that it is a reasonably close approximation. I wouldn't attempt to say it is exact.

Q Sometimes you shot a well and you increase its deliverability, and then you shot one and decrease it. Isn't that what happens sometimes?

A I think you can find any kind of a condition on individual wells that you think of in the San Juan, including one that we have got enough iron to start an iron mine. If we can just get it out.

Q Is that an answer, "yes" to my question?

A It is a qualified answer, yes, that you can find isolated conditions of anything you want to think of in the San Juan.

Q It is common, isn't it, that you don't increase the amount, same amount in the same shot in the same well, isn't it in different wells?

A Oh, yes, you would get different increases after shooting.

Q Or decreases?

A But that is probably a result of having different sand lenses.

Q You wouldn't contend, would you, that if you got a deliverability, just to use the figure of ten, whatever that represents, before you shot it, and that that ten represents a reserve of 50, and after you shot it you got a deliverability of 20, and therefore, the reserve, that represents a reserve of 100. You wouldn't contend that, would you?

A I wouldn't contend anything of that sort. I contend only this.

Q That answers my question.

A We have the uniform denominator, that is what I referring to. They call that out of contention, don't they?

Q I don't know.

A I claim that it is the common denominator and that it is the best indication of reserves that we have.

MR. SPURRIER: We will recess for ten minutes.

(Recess.)

MR. SPURRIER: The meeting will come to order, please. Does anyone else have a question of Mr. Reeves?

MR. GORDON: I would like to ask Mr. Reeves a question. Mr. Gordon with Tri-State.

By MR. GORDON:

Q Mr. Reeves, if all the wells are put on the same allowable, based on acreage, some of the stripper wells and we will call them marginal wells, would eventually play out, would they not?

A I would assume so, yes, sir.

Q Well, then, how long would it take the good wells on that same proration to produce their reserves? It would take them quite a few years, would it not?

A I am not sure I follow, or that I understand.

Q If everything is based on acreage --

A (Interrupting) Yes.

Q (Continuing) It might take some wells maybe 30 years, 30 times as long to produce their reserves as some of these marginal wells, is that not right, according to your figures?

A If it was on acreage, and that would be the same gas for every well, quite obviously 20 percent of the wells, we will say, drop out, it would serve to increase the average a little bit, but it would still leave the good wells with no incentive, worth just the same as a mediocre well in the field. Of course, as their failure to produce was added on to the others, you would get a little build up for the other wells.

Q But it would take a longer time for the good wells to produce their reserves?

A To get enough gas to recover the investment in them or to get any market for the reserves they had under them.

Q If the allowable were stepped down to the marginal wells, the pipeline companies couldn't get out what they want to take out of the field daily, could they?

A Oh, no, in other words, if you allocated below the average for the field, in other words, if you got a demand of so much gas in the field and you divide that by the total number of wells, which you do on a full hundred percent acreage factor, even though low average would be above what some wells could produce. On those wells you take what they couldn't produce and have to allocate it to the other wells that could make their allowable in the field.

Q You would have to give it to the other wells?

A That is right, you would average out the other wells and maybe raise it ten percent.

Q To break away from the acreage?

A Yes, because the acreage is impractical in the first place.

Q That is what I wanted to bring out.

A Yes, sir, the acreage is impractical in the first place.

MR. SPURRIER: Before we go any further, I think the Commission should make themselves clear again. Mr. Selinger, I believe, did not exactly state what the Commission visualized when

they set this hearing. In the first place we felt that, from the knowledge of our own records, [illegible] take-or-pay in effect in the Basin, but we are here to determine if it is not, and if proration is then necessary, and if so by what formula.

MR. SELINGER: That is true, Mr. Spurrier, and I believe I made a statement at the last time this matter was brought up, that as far as Skelly Oil Company is concerned, we would rather have the State allocate and then prorate than the pipelines.

MR. SPURRIER: That is all I have. Does anyone else have a question of Mr. Reeves?

MR. GRIENER: A. S. Griener.

By MR. GRIENER:

Q Mr. Reeves, you were talking during your testimony, about the various factors which needed to be considered in a determination of recoverable reserves and I believe you stated those factors were gross sand thickness, porosity, connate water, and initial pressure, is that correct?

A Gross sand thickness, connate water, reservoir pressure, yes, sir.

Q Are there any other factors which need to be considered in a reserve determination?

A That is correct, except of course, you have got to refer to certain pressures. In other words, basic units.

Q That is right. Initial pressure, I believe, was one of the components?

A That is right, but I mean the pressure of the unit of

measurements.

Q Yes, that is right. Do those same factors come into play in the determination of deliverability, that is to say, do all of them effect the deliverability of gas from a well?

A Yes, sir.

Q Are there any other factors besides these which may have an effect upon deliverability, which, according to your prior statement, would not have an effect upon reserves or would not be needed for a computation of reserves?

A Yes, there would be one item, permeability.

Q What I am getting at is just exactly that. How, if we go to deliverability, do we take into account the variances, if any, in permeability as between wells in order to make this formula really work out on a fair basis? We have one extra factor there then, is what I am getting at, in the deliverability which isn't and shouldn't be present on the reserve side. What are we going to do about the permeability aspect of it?

A That is one of the many items, and a have checked as many of the available core analysis as I could. I find that there is, so far as I could determine, no unreasonable increase in permeability with prorosity and for that reason it is the one factor that is rather up in the air, but based on the information I have there is no reason to expect any large increase in permeability, with a slight increase in porosity. In other words, they seem to run parallel to each other, contrary to some comments during the Sub-Committee discussions of this subject.

Q But you know of no wayof determining with any degree of accuracy, that the permeability conditions surrounding any particular well, as to whether they are more or less favorable than average or just about average?

A You have a few cores, Mr. Grigsby, and those cores, I plotted some of them, and permeability or porosity generally run along together with no out of proportion rate of increase on permeability, which would throw it off. So, I think that you are perfectly safe in assuming that permeability isn't a major factor in this.

Q But, it is a factor which is present in deliverability, but is not present in normal reserve calculations?

A That is right. That is the reason that I used the term recoverable reserves in here. For instance, we know that we have some gas out on fringe areas. The permeability is such that there is no gas produced and it is not recoverable. In other words, the reserves, unless you can recover them, they must have --

Q (Interrupting) I think we have the point which is the fact that there is one factor in your formula which does not relate to reserves?

A That is right, permeability in there.

MR. GRIGSBY: Thank you very much.

MR. SPURRIER: Anyone else? If not the witness may be excused.

MR. UTZ: I would like to ask the witness a question, please.

By MR. UTZ:

Q On this core information that you speak of, can you tell me how many cores you used to arrive at your minimum and maximum?

A I had three cores, two of which were in the Basin and those cores were given to us on a confidential basis. One outside of the Mesaverde area, that is, the present Mesaverde or the Blanco Mesaverde field, what was in one of the sands. I believe that was Point Lookout in one and Cliffhouse in the other, which I was basing my comments on porosity up to 28.4. We did not have any core information on the big wells, because they were drilled in with gas and we couldn't core them, so I don't know what the porosities are in those better wells.

Q I understand that. These averages, in other words, was 4.6 and 15.4, an average of the whole core or was it local areas in the core?

A That was individual sands. In other words, individual sand stringers. In other words, this stringer 4.6, this 1.14 this 1.9, it was not an attempt to get an average, but to show how the lenticular sands don't carry between wells, have different porosity. If you happen to get sands with good porosity in one well, how you could increase the reserve under that one well. I don't know whether I made myself clear or not.

Q Did you compare the possible local areas in one core against the possible higher areas in the other cores, is that my understanding?

A Let's take these here. Suppose that in your core analysis that you ran here from, oh, five up to ten, and what I tried to do is see what these individual lenticular sands that seemed to exist in the wells would run, and then I said that if you get the maximum porosity in a series of these sands, there seems to be no rhyme or reason where they occur, that then you had a well of high average porosity. Is that clear, my thinking on that, Mr. Utz?

Q No, it is not clear. On your shut-in pressures now, do you have a record of how many days this 933 pound shut-in pressure, how many days the well was shut-in on the 933 pound pressure?

A Those could be dug out, Mr. Utz. However, those pressures were based upon pressures taken prior to I. P. official test.

Q You don't know for either pressure just how long the well was shut-in?

A No, sir, I couldn't say, they were approximately comparable times.

Q Then it is possible that the 933 pound pressure was a maximum build up?

A There is a possibility that it could have built up to 940, 945, there was still a difference there, I am sure of that.

Q I would still like to get back to some sort of a reserve figure on your State Number 6. Do you happen to have that information?

A At the time that we filed a registration statement a year or so ago, these figures are from memory, they are approximately correct, but originally that was over 100,000,000 per acre, and

then as I recall, in arguments with S. E. C. Geological staff, I am probably violating some law, of quoting what S. E. C passed on, and those figures were not passed on by S. E. C. In other words, they admitted our registration statement, but in discussion, as I remember, we talked anywhere from 80 to 100 million an acre on that. An independent geologist estimated over 100,000,000 an acre.

Q In other words it is pretty high?

A It is plenty high, yes, sir.

MR. SPURRIER: Mr. Macey?

By MR. MACEY:

Q In connection with your estimation of 450 feet of gross pay, what is your definition of gross pay?

A That is all sand, without an attempt to determine whether or not it is productive.

Q Does that same figure apply to the use of the 100,000,000 figure?

A Yes. What I was trying to do was get a relationship between the available storage space. It was my thought that the sand containing proportion reserves, which would give you the 4.5 to 1 factor in any case.

Q Do you maintain there is a well in the Basin that has 450 feet of pay?

A No, I said gross sand.

Q You don't use gross sand in calculating reserves, do you?

A That is right, but that is not sand. Now, my thought was

that then you start picking net sands, that then you get into an argument between geologists as to which sand is net and productive. The point that I was trying to make in this was show maximum variation between wells and I think that the gross sand overall would be proportional to the net sands, after you picked them out.

Q In other words, as I understand both your answers to Mr. Utz' question and to mine, you have taken the absolute extreme cases, which theoretically could exist if all the conditions were ideal and then you have compared those. Well, what have you compared them to?

A Mr. Macey, I think that I have been rather liberal in taking my limits. I am glad that you asked that question. I think you could very well drop your porosity below 4.6 for some production in there. If you did that and then I pointed out that we had 28.4 -- in other words, two into that is 14 times on the multiplier instead of the four, so I would end up with 150. What I tried to do in picking my minimum was a condition with thin sand where I would get about -- in my opinion 750 I. P, or 150,000 deliverability. Is it clear? In other words, you could drop -- For instance on that figure this morning, if some guy had plugged a dry hole it might have had a deliverability of 1 MCF and then you had a ratio of 10,000 to 1. If you say a dry hole, you get a smell out of it, you say the ratio is infinity. You have to arrive at some reasonable point of productivity.

Q You feel that your minimum figures are a reasonable point?

A Yes, sir, I think so, within limits, Mr. Macey. I am trying to arrive at some overall guides as to what could be expected.

Q You compared your -- If I remember correctly, you came up with a variation in deliverability of 33 to 1, or approximately that, did you not?

A I came up with a possible variation on these factors, approaching it from that angle of 46.4 to 1. Now, assuming that any well below 750,000 I. P. or 150,000 deliverability is non-commercial, marginal and should never have been drilled in the first place. That is your minimum gas well and that is the one that the minimum factors, I would take, would produce. The biggest well you have in the Basin is about 23,500,000, if I remember, and that is 33.1 to 1 as compared to the possible 46.4 to 1, with all the factors at best, which indicates that that deliverability in that well is not unreasonable compared to what you could have in reserves if your factors were right.

MR. MACEY: That is all.

MR. SPURRIER: Anyone else?

MR. UTZ: I have one more question I wish to ask on this porosity.

By MR. UTZ:

Q In figuring reserves, Mr. Reeves, you would not necessarily pick for any one sand stringer, which I understand is the way that you arrived at the minimum or maximum. You wouldn't necessarily pick that one sand stringer and call that the average porosity for

the net pay in that well bore, would you?

A Oh, no, sir. In other words, you have to arrive -- Let's take this well here (indicating). You have entries all up and down the hole. Now, to figure reserves you have to figure an average porosity in there. The point I am getting at is the individual sand stringers have shown porosities at various places, 4.6 to 20. Some of these wells undoubtedly have an average porosity of 6, 8 or what have you. That affects the deliverability. It has some effect on it and it also determines your reserves.

Q In other words, if you were figuring your reserves on any well bore up there, one of which might happen to have 4.6 minimum, you would probably use a higher porosity in actually figuring the reserve?

A In other words, you could have a well with an average of 4.6. There are a lot of porosities there down to, oh, 2 percent, for that matter, but you would come up there and you would average it out, and that would be your reserve, the base of your reserves, the figure that you would use in the formula.

Q Did I understand you to say you think there is an average porosity as low as 4.6?

A I think there is porosity that low. I think there is on the average poor well where you get the sand pitts.

Q Is there, as you say there is 100 foot of those sands?

A As a matter of fact, here the Point Lookout well 268 might be -- I don't know what the porosity is in that.

Q Likewise would you say that any well that I would be

figure reserves on, or any well that you figured reserves on, you would use an average porosity as high as 15.1?

A On State 5, I think your porosities could well be figured above 15.6. I think on the Turner No. 1 State 1 that they are above that.

Q For your information we have a number, of more than three available, and we don't have a range higher than 7.17 percent.

MR. SPURRIER: Anyone else have a question of Mr. Reeves?

MR. DAVIS: Quillman Davis, Aztec Oil and Gas Company.

By MR. DAVIS:

Q Are you familiar with the gas reserves estimates per acre that have been made by the Federal Power Commission in hearings relating to the San Juan Basin?

A I have at one time. I don't recall the figures.

Q Would you be surprised if those estimates were under 20,000,000?

A Oh, I understand that some of those have been taken into account, the whole basin, poor areas along with the good, that the estimates have been as low as seven to eight million. I might point out that Pubco, at the time that Southern Union filed an application or registration statement, and I believe you showed 7,000,000 at that time, about two or three years ago. At that time our average that was passed on, the acreage we had which was in the area where there were high reserves, I think, was 14,000,000. Might I check that? 14 to 22,000,000, so that has been passed.

Q There is a rather wide difference of opinion as to the reserves. If you get between 80 and 100 million reserves for your so-called State 6 well?

A No, sir, I wouldn't say so. I think we are talking about different things. In other words, if you take a whole area in here (indicating) with a dog-gone good pasture in the middle and a bunch of overrun pasture around the sides, you are going to get a low average of 7. The guy that based the average of 7 on the whole thing may have determined that by getting 5,000,000 down here and 20,000,000 up here. It doesn't necessarily follow that the geologists were wrong on their estimates.

Q Maybe I misunderstood your earlier testimony. You kept referring to the two factors that we know about in the Basin, as to the wells, one of which was the I. P. and the other the ddiverability.

You don't intend to imply that we don't also know or could determine these other factors that are being proposed as an allocation formula? In other words, you can determine the other factors, too?

A Yes.

Q We certainly know the acreage, too. I didn't know whether you were implying those were the only two we knew or not?

A I implied certain other things about the acreage factor as a multiplier with pressure.

Q One other question, too. Some of these smaller wells you were bringing out awhile ago the fact that if you did allow any other

factor other than deliverability that you would have a redistribution of your allowable, then in effect the pipeline companies are able to get the gas that they need from the area without being penalized. You don't have any penalty because of any formula, do you?

A Well, what it would amount to would be simply this, that you would say up to the point that the pipeline companies have got gas, every well here that two hundred would produce two hundred thousand, three hundred thousand, four hundred thousand. Then, all they needed on the rest would be 450, so you would end up with 450 against this well with deliverability of 10,000,000, andthis guy with 450 would get all of it. He would get all he is able to produce.

Q You are not suggesting the small wells be plugged?

A Well, I think, as a matter of fact, if your money is in there, I think it is perfectly evident that any man that gets an initial potential of less than 2,000,000 a day is going to wait a long long time to get his money out. If it is a potential of a million and a half or three hundred thousand a day I don't think there is a possibility he will ever get his money out, let alone profit.

Q You should let him have the opportunity to get as much as he could out?

A The wells are drilled, but they should be allowed to produce the gas, but not to detriment to where it would hurt the good wells. No one is going out there and drill if they are going to have to

sell four hundred to five hundred thousand out of the well. It just don't make sense. There is better places to spend your money.

By MR. FOSTER:

Q Are you saying that all the high-potential wells --

A (Interrupting) Without the hope of wells, better than two and a half million to three million, I don't think anybody would drill in the Basin, certainly I wouldn't spend my company's money on it.

MR. SPURRIER: We will recess until 9:00 o'clock tomorrow morning.

THOMAS J. QUIGLEY
OIL EXPLORATION
311 BANK OF AMERICA BUILDING
BEVERLY HILLS, CALIFORNIA
BRadshaw 2-4903 CRestview 1-7829

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
DEC 17 1951

December 15, 1951

Oil Conservation Commission
State of New Mexico
Santa Fe, New Mexico

In Re: Case 330
(Proration Blanco Mesa Verde Gas Pool)

Gentlemen:

The writer was one of the earliest operators in the area above described and is still the owner of royalties and leases and operating interests in several thousand acres in the area.

Long before Mr. Florance drilled the first well which really opened up that Blanco Mesa Verde area, the writer endeavored to interest Stanolind as well as many other companies in prospecting the Blanco Largo Canyon area:and turned over some of his land to Mr. Florance in an effort to get the area drilled. So my associates and I are thoroughly familiar with the area, having practically pioneered it.

We have given the matter considerable study and are convinced that proration at this time is ridiculous and would discourage considerable drilling.

I am just in receipt of a letter from one of the largest companies in the United States which is now actively operating in the San Juan basin. I brought them in, personally, after considerable effort and they are now developing some of my lands. They have already drilled a couple of wells on my land and I wrote them ten days ago, asking them about their development plans for 1952 and I quote from a letter received from them just yesterday:

> "We understand that plans are afoot for proration and one of the companies interested in that area has applied for proration of production.
>
> "Our future development will depend somewhat on developments as to market and price and the results of efforts to prorate production."

Here is concrete evidence that even the thought of proration has immediately slowed up development. There is no question about its harmful effect upon the Basin at this time.

We sincerely trust you will reject Stanolind's application.

Cordially yours,

T. J. Quigley

Thomas J. Quigley

TJQ:m

JAN 23 1952

Exh. No 1
Case 330
Stevo

BLANCO MESAVERDE POOL GAS PRODUCTION DATA

Date		Gas Production, MCF
1928 and 1929		744,000 (estimated)
1930 through June, 1934		175,000
1934, June through Dec.		8,456
1935		16,450
1936		35,246
1937		28,604
1938		28,652
1939		32,469
1940		34,063
1941		38,687
1942		39,656
1943		38,026
1944		47,242
1945		54,800
1946		67,322
1947		90,000 (approx.)
1948		75,887
		1,554,560
	Correction of 1928-29 estimate -	160,560
		1,394,000
	Pictured Cliffs 25%	348,000
		1,046,000
1949		67,589
1950		1,174,909
1951	10 Months	5,851,281

Cumulative Production November 1, 1951 8,139,779 MCF

RECENT DEVELOPMENT EXTENDING THE BLANCO MESAVERDE POOL

COMPLETED WELLS

Operator	Lease	Well No.	Location			*Zone	Potential MCF/Day	Date
			Section	Township	Range			
San Juan Producing Co.	Howell	1D	28	31N	8W	C.M.P.	3310	8-8-51
" " "	"	2D	29	31N	8W	C.M.P.	6000	8-29-51
" " "	"	3D	31	31N	8W	C.M.P.	11000	9-25-51
" " "	"	4D	33	31N	8W	C.M.P.	3540	11-2-51
" " "	"	2E	14	30N	8W	C.M.P.	8840	10-13-51
" " "	"	1G	24	30N	8W	C.M.P.	3300	10-20-51
" " "	"	2C	3	29N	8W	C.M.P.	3870	8-29-51
" " "	"	1C	1	29N	8W	C.M.P.	4500	8-10-51
" " "	"	2K	22	30N	8W	C.M.P.	4380	11-27-51

* C - Cliffhouse
  M - Menefee
  P - Point Lookout

Ex No 5
Case 330
Stanco

In the Matter of the Application
of Stanolind Oil and Gas Company
for the Amendment of Order No. ~~799~~, R-110
Relating to the Blanco (Mesaverde)
Pool, San Juan County, New Mexico

ORDER OF THE COMMISSION

By the Commission:

This matter came in for hearing at o'clock on the day of , 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereafter referred to as the "Commission".

NOW, on the day of , 1951, the Commission having considered the whole matter including the testimony adduced at said hearing,

FINDS:

1. That the public notice having been given by law, the Commission has jurisdiction of this cause and the subject matter thereof.

2. That for purposes of prevention of waste, and protection of correlative rights, Sec. 11 of Order ~~799~~, R-110 relative to the Blanco Pool, should be amended to provide for a definite method of allocating gas between proration units in the pool.

IT IS THEREFORE ORDERED,

1. That Section No. 11 of Commission Order No. R-110, issued November 9, 1951, is hereby amended to read as follows:

Section 11: Gas Wastage. Mesaverde gas shall not be flared except for initial tests since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field connected to a pipe line and capable of delivering gas thereto shall be permitted to produce, so long as such can be done without waste, ratably on the basis of an annual calendar year (January 1 - December 31) or aliquot part thereof for wells connected to a pipe line for less than a year, in proportion to the deliverability of each well, determined by the capacity of each such well to produce against a uniform back pressure to be fixed by the Commission; provided that each operator shall have a period of one year following the year in which production occurs to adjust any overages or underages

as between his different properties; provided further that each operator shall have a right over a like period to make up any deficiency in his ratable share of production as compared to that of each other operator, such right to include such priority and such share of the total available market of production from lands in the pool as will permit the deficiency to be made up within the time allowed.

A. The reasonable, lawful, required production from wells in the Blanco-Mesaverde Pool shall be determined by nominations for the production of gas from wells producing therefrom, submitted to the Commission in affidavit form by the purchasers of said gas on or before December 1st of each year for the next succeeding year; however, the Commission will adjust the allowed production as determined by this method, taking into consideration the previous overproduction or underproduction from the pool, in order that actual production will be equal to the demand; provided further that the purchasers of gas in the Blanco-Mesaverde Pool may, in cases where their demand for gas differs substantially from previously submitted nominations, submit amended nominations which reflect more accurately their requirements, and the allowables of all wells shall be adjusted accordingly by the Commission.

B. The average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined, from the effective date of this order to January 1, 1953, by allocating the allowable production for wells in the Pool among the individual wells in the proportion that the most recent official open flow potential of each well bears to the summation of such potentials of all wells in the Pool so connected.

C. Subsequent to January 1, 1953, the average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined by allocating the allowable production for wells in the Pool among the respective wells in the proportion that the product of deliverability and the acreage assigned to each such well bears to the summation of the products of these factors for all such wells; provided that the allowable of low capacity wells may be set at their ability to produce as estimated by the operator thereof, such allowable not to exceed that allowable which would

be assigned said wells under the allocation formula; and, provided further that the Commission shall set a minimum allowable, to be determined after study of deliverability tests and other factors, which shall be allocated to any well whose allowable as calculated by the method outlined above is a lesser figure.

D. Deliverability is defined as the indicated capacity of the well to produce against a stipulated pressure as determined by a test to be approved subsequently by this Commission.

E. The deliverability of each well as described above shall be determined on all wells and submitted to the Commission during a period to be set by the Commission and during the same period each year thereafter.

F. Beginning with January 1, 1953, the date January 1st of each year shall be the balancing date for the purpose of computing and balancing overproduction and underproduction in the Blanco-Mesaverde Field, and the twelve-month period beginning at 7:00 A.M. January 1st and ending at 7:00 A.M. January 1st of the following year shall be considered as the "balancing period". The proration periods shall coincide with the balancing periods.

G. Any well in the Blanco-Mesaverde Pool may, subject to the hereinafter described conditions, be produced in excess of the allowable allocated to such well; provided, that any well overproduced as of a balancing date, and which was overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut-in until the overproduction is made up.

H. Any well which is underproduced as of a balancing date may carry forward such underproduction as allowable credit to be produced during the next balancing period; provided, that such underproduction not made up during the balancing period immediately following shall be cancelled at the next balancing date; and, further, that any well cumulatively underproduced on two successive balancing dates due to lack of ability to produce shall not be assigned an average daily allowable greater than the average daily production had from such well during the preceding balancing period.

I. The Commission shall issue, by January 20th of each year a schedule showing the allowable assigned each well for that year and the overproduction or underproduction charged against or credited to such well. Each well completed during any proration period shall, for the remainder of said period, be given an average daily allowable computed in accordance with the proration formula in effect during that particular year.

J. Such reports as may be required by the Commission in order to accomplish the procedure outlined above shall be submitted by the operators and purchasers in the Blanco-Mesaverde Pool.

See Case 330
Order R-128
(Para. 1)

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

CASE No. 331
ORDER No. R-129-A
(Reference to Case 330)

THE APPLICATION OF THE OIL CONSERVATION
COMMISSION OF NEW MEXICO UPON ITS OWN
MOTION FOR AN ORDER FOR THE EXTENSION
OF EXISTING POOLS, CONSOLIDATION OF POOLS,
OR CREATION OF NEW POOLS IN LEA, SAN JUAN
AND RIO ARRIBA COUNTIES, NEW MEXICO.

NUNC PRO TUNC ORDER OF THE COMMISSION

It appearing to the Commission that the order heretofore entered in the above entitled cause is not a correct memorial of the judgment as rendered and announced by this Commission in that Order No. (4) (a) of said order, through inadvertence and clerical error, extended the Blanco-Mesaverde pool to include:

T. 27 N, R. 6 W, NMPM
All of secs. 13, 24, 25, 26

T. 27 N, R. 7 W, NMPM
All of secs. 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, and 33

T. 26 N, R. 6 W, NMPM
All of secs. 1 and 12

T. 26 N, R. 7 W, NMPM
All of secs. 5, 6, 7 and 8

when it should have been shown as being extended to include:

T. 27 N, R. 8 W, NMPM
All of secs. 23, 24, 25 and 36

T. 27 N, R. 7 W, NMPM
All of secs. 16 thru 21, incl.
All of secs. 28 thru 33, incl.

T. 26 N, R. 8 W, NMPM
All of secs. 1 and 12

T. 26 N, R. 7 W, NMPM
All of secs. 5 thru 8, incl.

THEREFORE, it is hereby ordered that the order heretofore entered by this Commission in the above entitled cause on March 26, 1952, be, and the same hereby is corrected to conform to the actual finding announced and rendered by the Commission by modifying Order No. (4) (a) to read, as follows:

T. 27 N, R. 8 W, NMPM
All of secs. 23, 24, 25 and 36

T. 27 N, R. 7 W, NMPM
All of Secs. 16 thru 21, incl.
All of Secs. 28 thru 33, incl.

T. 26 N, R. 8 W, NMPM
All of Secs. 1 and 12

T. 26 N, R. 7 W, NMPM
All of Secs. 5 thru 8, incl.

and said order in all other respects is hereby ratified and confirmed; and

IT IS FURTHER ORDERED, that this order correcting the record of said order be entered nunc pro tunc as of the 26th day of March 1952, that being the date when said order was originally made and entered.

DONE this TWENTIETH day of May 1952.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

GUY SHEPARD, Member

R. R. SPURRIER, Secretary

S E A L

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR THE AMENDMENT OF ORDER NO. R-110 RELATING TO THE BLANCO-MESAVERDE POOL, SAN JUAN COUNTY, NEW MEXICO.

CASE NO. 330
ORDER NO. R-128

ORDER OF THE COMMISSION

BY THE COMMISSION:

This matter came on for hearing at 10 a. m. on the 18th day of December 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on the 6th day of March 1952, the Commission, a quorum being present, having considered the testimony adduced and the exhibits introduced in evidence and arguments presented, and being fully advised in the premises,

FINDS:

(1) That due notice having been given according to law, and all interested parties having appeared, the Commission has jurisdiction of this cause, and the subject matter hereof.

(2) That the evidence adduced fails to show that production within the pool, at this time, has approached demand necessitating the establishment of proration of production.

(3) That this case should be continued for such a time as may be required for operators in the pool to ascertain the deliverability of production from wells, and for the preparation of information (such as decline curves, etc.) upon which proration of production within the Blanco-Mesaverde Pool could be set up and established as a basis of experience.

IT IS THEREFORE ORDERED:

(1) That extension of the Blanco-Mesaverde Pool boundary will be considered in Case 331, pending before the Commission.

(2) That application for proration in the Blanco-Mesaverde Pool is pending presentation of further evidence.

IT IS FURTHER ORDERED:

That this case be and it hereby is continued and that a further hearing be held at the regularly advertised December 1952 hearing of the Commission, at which time evidence will be heard with reference to interim production experience in said pool.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

/s/ EDWIN L. MECHEM, Chairman

/s/ GUY SHEPARD, Member

/s/ R. R. SPURRIER, Secretary

SEAL

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

November 21, 1951

COPY

Mr. Al Greer
Box 697
Aztec, New Mexico

Dear Al:

I am sending you a copy of our Notice of Publication in Case 33 relating to gas proration in the Blanco pool. As you will note, the advertisement on this case is ratherlengthy because the Commission desires that the widest possible publicity be given to this hearing.

We wouldlike for you to let the operators and others interested know of this case and what is proposed insofar as you are able to do so, so that none will be able tosay they were not advised of what was contemplated at the time of the hearing December 18.

Anything you can do to give this case publicity will be appreciated.

Sincerely,

Jason Kellahin

JK:mr

Wm. Mansfield
OIL PROPERTIES
209 North Lorena Avenue
FARMINGTON, NEW MEXICO

December-15-1951-

Regarding Proration of Natural Gas.

To whom it may concern.

The proration should cover all Gas wells regardless of the formation the wells are producing from or from any formation that is not producing from at this time, that become productive at any time hereafter.

All Gas wells regardless of size should be given an equal basis, (not an equal percentage basis), and this provisio should continue pirmantly until the smaller wells are producing their capacity, through the same size tubing used in all wells, and at this time if the market demand is greater than the smaller wells can produce, the larger wells should be allowed to produce the over amount of the market demand.

In regards to a differential governing Gas wells that deliver Gas into different main line Gas pipe lines, there should not be any difference of proration, unless it is necessary to reduce overhead operations, and in this event the averages per well per year, should be adjusted during not over one year.

The State of New Mexico, and the Department of the Interior of the United States or its field agents, should employ Experienced Gas Engineers, on a permanent basis, to check all wells, and equipment used in the measurement and delivery of Gas produced, and delivered into all pipe lines regardless of the ownership of the wells. The engineers employed for this work shall make daily reports on a monthly basis, to their respective superiors and their respective superiors shall adjust any discrepancies found, within a period of 30 days after such faults are found.

If there is not a sufficient income being paid to the State and Government agencies who have the jurisdiction over the departments regularly assigned to administer these problems, then the amount of Tax being paid to these agencies should be increased a sufficient amount to properly take care of the work of the Engineers and necessary assistants.

Very truly Yours,

Wm. Mansfield

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JAN 23 1952

Re Case 350

C
O
P
Y

WM. MANSFIELD
Oil Properties
209 North Lorena Ave.
Farmington - New Mexico

December 15, 1951

Regarding Proration of Natural Gas

To Whom It May Concern:

The proration should cover all gas wells regardless of the formation the wells are producing from or from any formation that is not producing from at any time, that become productive at any time hereafter.

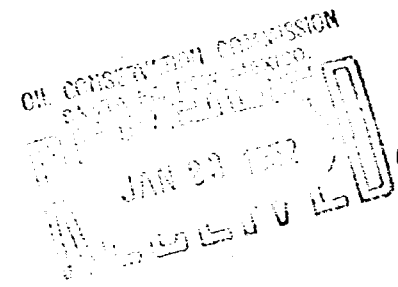
All gas wells regardless of size should be given an equal basis, (not an equal percentage basis), and this proviso should continue permanently until the smaller wells are producing their capacity, through the same size tubing used in all wells, and at this time if the market demand is greater than the smaller wells can produce, the larger wells should be allowed to produce the over amount of the market demand.

In regards to differential governing gas wells that deliver gas into different main liner gas pipe lines, there should not be any difference of proration, unless it is necessary to reduce overhead operation, and in this event the average per well per year, should be adjusted during not over one year.

The state of New Mexico, and the Department of the Interior of the United States or its field agents, should employ experienced gas engineers on a permanent basis, to check all wells, and equipment used in the measurement and delivery of gas produced, and delivered into all pipe lines regardless of ownership of the wells. The engineers employed for this work shall make daily reports on a monthly basis, to their respective superiors and their respective superiors shall adjust any discrepancies found, within a period of 30 days after such faults are found.

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Very truly yours,



(Signed) Wm. Mansfield

Re: Case 330

C
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P
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Farmington - New Mexico

December 15, 1951

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Very truly yours,

(Signed) Wm. Mansfield

COPY

Re - Case 330

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WM. MANSFIELD
Oil Properties
209 North Lorena Ave.
Farmington - New Mexico

December 15, 1951

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If there is not a sufficient income being paid to the state and government agencies who have the jurisdiction over the departments regularly assigned to administer these problems, then the amount of tax being paid to these agencies should be increased a sufficient amount to properly take care of the work of the engineers and necessary assistants.

Very truly yours,

(Signed) Wm. Mansfield

Re- Case 330

COPY

— As presented by
Standard in Case 330 —
Dec. 18 hearing.

In the Matter of the Application
of Stanolind Oil and Gas Company
for the Amendment of Order No. ~~799~~, R-110
Relating to the Blanco (Mesaverde)
Pool, San Juan County, New Mexico

ORDER OF THE COMMISSION

By the Commission:

This matter came in for hearing at 10 o'clock on the 18 day of 1951, 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereafter referred to as the "Commission".

NOW, on the day of , 1951, the Commission having considered the whole matter including the testimony adduced at said hearing,

FINDS:

1. That the public notice having been given by law, the Commission has jurisdiction of this cause and the subject matter thereof.

2. That for purposes of prevention of waste, and protection of correlative rights, Sec. 11 of Order [redacted] R-110 relative to the Blanco Pool, should be amended to provide for a definite method of allocating gas between proration units in the pool.

IT IS THEREFORE ORDERED,

1. That Section No. 11 of Commission Order No. R-110, issued November 9, 1951, is hereby amended to read as follows:

Section 11: Gas Wastage. Mesaverde gas shall not be flared except for initial tests since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field connected to a pipe line and capable of delivering gas thereto shall be permitted to produce, so long as such can be done without waste, ratably on the basis of an annual calendar year (January 1 - December 31) or aliquot part thereof for wells connected to a pipe line for less than a year, in proportion to the deliverability of each well, determined by the capacity of each such well to produce against a uniform back pressure to be fixed by the Commission; provided that each operator shall have a period of one year following the year in which production occurs to adjust any overages or underages

as between his different properties; provided further that each operator shall have a right over a like period to make up any deficiency in his ratable share of production as compared to that of each other operator, such right to include such priority and such share of the total available market of production from lands in the pool as will permit the deficiency to be made up within the time allowed.

A. The reasonable, lawful, required production from wells in the Blanco-Mesaverde Pool shall be determined by nominations for the production of gas from wells producing therefrom, submitted to the Commission in affidavit form by the purchasers of said gas on or before December 1st of each year for the next succeeding year; however, the Commission will adjust the allowed production as determined by this method, taking into consideration the previous overproduction or underproduction from the pool, in order that actual production will be equal to the demand; provided further that the purchasers of gas in the Blanco-Mesaverde Pool may, in cases where their demand for gas differs substantially from previously submitted nominations, submit amended nominations which reflect more accurately their requirements, and the allowables of all wells shall be adjusted accordingly by the Commission.

B. The average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined, from the effective date of this order to January 1, 1953, by allocating the allowable production for wells in the Pool among the individual wells in the proportion that the most recent official open flow potential of each well bears to the summation of such potentials of all wells in the Pool so connected.

C. Subsequent to January 1, 1953, the average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined by allocating the allowable production for wells in the Pool among the respective wells in the proportion that the product of deliverability and the acreage assigned to each such well bears to the summation of the products of these factors for all such wells; provided that the allowable of low capacity wells may be set at their ability to produce as estimated by the operator thereof, such allowable not to exceed that allowable which would

be assigned said wells under the allocation formula; and, provided further that the Commission shall set a minimum allowable, to be determined after study of deliverability tests and other factors, which shall be allocated to any well whose allowable as calculated by the method outlined above is a lesser figure.

D. Deliverability is defined as the indicated capacity of the well to produce against a stipulated pressure as determined by a test to be approved subsequently by this Commission.

E. The deliverability of each well as described above shall be determined on all wells and submitted to the Commission during a period to be set by the Commission and during the same period each year thereafter.

F. Beginning with January 1, 1953, the date January 1st of each year shall be the balancing date for the purpose of computing and balancing overproduction and underproduction in the Blanco-Mesaverde Field, and the twelve-month period beginning at 7:00 A.M. January 1st and ending at 7:00 A.M. January 1st of the following year shall be considered as the "balancing period". The proration periods shall coincide with the balancing periods.

G. Any well in the Blanco-Mesaverde Pool may, subject to the hereinafter described conditions, be produced in excess of the allowable allocated to such well; provided, that any well overproduced as of a balancing date, and which was overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut-in until the overproduction is made up.

H. Any well which is underproduced as of a balancing date may carry forward such underproduction as allowable credit to be produced during the next balancing period; provided, that such underproduction not made up during the balancing period immediately following shall be cancelled at the next balancing date; and, further, that any well cumulatively underproduced on two successive balancing dates due to lack of ability to produce shall not be assigned an average daily allowable greater than the average daily production had from such well during the preceding balancing period.

I. The Commission shall issue, by January 20th of each year a schedule showing the allowable assigned each well for that year and the overproduction or underproduction charged against or credited to such well. Each well completed during any proration period shall, for the remainder of said period, be given an average daily allowable computed in accordance with the proration formula in effect during that particular year.

J. Such reports as may be required by the Commission in order to accomplish the procedure outlined above shall be submitted by the operators and purchasers in the Blanco-Mesaverde Pool.

In the Matter of the Application
of Stanolind Oil and Gas Company
for the Amendment of Order No. ~~799~~ R-110
Relating to the Blanco (Mesaverde)
Pool, San Juan County, New Mexico

ORDER OF THE COMMISSION

By the Commission:

This matter came in for hearing at o'clock on the day of , 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereafter referred to as the "Commission".

NOW, on the day of , 1951, the Commission having considered the whole matter including the testimony adduced at said hearing,

FINDS:

1. That the public notice having been given by law, the Commission has jurisdiction of this cause and the subject matter thereof.

2. That for purposes of prevention of waste, and protection of correlative rights, Sec. 11 of Order ~~799~~ R-110, relative to the Blanco Pool, should be amended to provide for a definite method of allocating gas between proration units in the pool.

IT IS THEREFORE ORDERED,

1. That Section No. 11 of Commission Order No. R-110, issued November 9, 1951, is hereby amended to read as follows:

Section 11: Gas Wastage. Mesaverde gas shall not be flared except for initial tests since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field connected to a pipe line and capable of delivering gas thereto shall be permitted to produce, so long as such can be done without waste, ratably on the basis of an annual calendar year (January 1 - December 31) or aliquot part thereof for wells connected to a pipe line for less than a year, in proportion to the deliverability of each well, determined by the capacity of each such well to produce against a uniform back pressure to be fixed by the Commission; provided that each operator shall have a period of one year following the year in which production occurs to adjust any overages or underages

as between his different properties; provided further that each operator shall have a right over a like period to make up any deficiency in his ratable share of production as compared to that of each other operator, such right to include such priority and such share of the total available market of production from lands in the pool as will permit the deficiency to be made up within the time allowed.

A. The reasonable, lawful, required production from wells in the Blanco-Mesaverde Pool shall be determined by nominations for the production of gas from wells producing therefrom, submitted to the Commission in affidavit form by the purchasers of said gas on or before December 1st of each year for the next succeeding year; however, the Commission will adjust the allowed production as determined by this method, taking into consideration the previous overproduction or underproduction from the pool, in order that actual production will be equal to the demand; provided further that the purchasers of gas in the Blanco-Mesaverde Pool may, in cases where their demand for gas differs substantially from previously submitted nominations, submit amended nominations which reflect more accurately their requirements, and the allowables of all wells shall be adjusted accordingly by the Commission.

B. The average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined, from the effective date of this order to January 1, 1953, by allocating the allowable production for wells in the Pool among the individual wells in the proportion that the most recent official open flow potential of each well bears to the summation of such potentials of all wells in the Pool so connected.

C. Subsequent to January 1, 1953, the average daily allowable production of gas from individual wells completed in the Blanco-Mesaverde Pool shall be determined by allocating the allowable production for wells in the Pool among the respective wells in the proportion that the product of deliverability and the acreage assigned to each such well bears to the summation of the products of these factors for all such wells; provided that the allowable of low capacity wells may be set at their ability to produce as estimated by the operator thereof, such allowable not to exceed that allowable which would

be assigned said wells under the allocation formula; and, provided further that the Commission shall set a minimum allowable, to be determined after study of deliverability tests and other factors, which shall be allocated to any well whose allowable as calculated by the method outlined above is a lesser figure.

D. Deliverability is defined as the indicated capacity of the well to produce against a stipulated pressure as determined by a test to be approved subsequently by this Commission.

E. The deliverability of each well as described above shall be determined on all wells and submitted to the Commission during a period to be set by the Commission and during the same period each year thereafter.

F. Beginning with January 1, 1953, the date January 1st of each year shall be the balancing date for the purpose of computing and balancing overproduction and underproduction in the Blanco-Mesaverde Field, and the twelve-month period beginning at 7:00 A.M. January 1st and ending at 7:00 A.M. January 1st of the following year shall be considered as the "balancing period". The proration periods shall coincide with the balancing periods.

G. Any well in the Blanco-Mesaverde Pool may, subject to the hereinafter described conditions, be produced in excess of the allowable allocated to such well; provided, that any well overproduced as of a balancing date, and which was overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut-in until the overproduction is made up.

H. Any well which is underproduced as of a balancing date may carry forward such underproduction as allowable credit to be produced during the next balancing period; provided, that such underproduction not made up during the balancing period immediately following shall be cancelled at the next balancing date; and, further, that any well cumulatively underproduced on two successive balancing dates due to lack of ability to produce shall not be assigned an average daily allowable greater than the average daily production had from such well during the preceding balancing period.

I. The Commission shall issue, by January 20th of each year a schedule showing the allowable assigned each well for that year and the overproduction or underproduction charged against or credited to such well. Each well completed during any proration period shall, for the remainder of said period, be given an average daily allowable computed in accordance with the proration formula in effect during that particular year.

J. Such reports as may be required by the Commission in order to accomplish the procedure outlined above shall be submitted by the operators and purchasers in the Blanco-Mesaverde Pool.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR THE AMENDMENT OF ORDER NO. R-110 RELATING TO THE BLANCO-MESAVERDE POOL, SAN JUAN COUNTY, NEW MEXICO.

CASE NO. 330
ORDER NO. R-128

ORDER OF THE COMMISSION

BY THE COMMISSION:

This matter came on for hearing at 10 a. m. on the 18th day of December 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on the 6th day of March 1952, the Commission, a quorum being present, having considered the testimony adduced and the exhibits introduced in evidence and arguments presented, and being fully advised in the premises,

FINDS:

(1) That due notice having been given according to law, and all interested parties having appeared, the Commission has jurisdiction of this cause, and the subject matter hereof.

(2) That the evidence adduced fails to show that production within the pool, at this time, has approached demand necessitating the establishment of proration of production.

(3) That this case should be continued for such a time as may be required for operators in the pool to ascertain the deliverability of production from wells, and for the preparation of information (such as decline curves, etc.) upon which proration of production within the Blanco-Mesaverde Pool could be set up and established as a basis of experience.

IT IS THEREFORE ORDERED:

(1) That extension of the Blanco-Mesaverde Pool boundary will be considered in Case 331, pending before the Commission.

(2) That application for proration in the Blanco-Mesaverde Pool is pending presentation of further evidence.

IT IS FURTHER ORDERED:

That this case be and it hereby is continued and that a further hearing be held at the regularly advertised December 1952 hearing of the Commission, at which time evidence will be heard with reference to interim production experience in said pool.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Edwin L. Mechem
EDWIN L. MECHEM, CHAIRMAN

Guy Shepard
GUY SHEPARD, MEMBER

R. R. Spurrier
R. R. SPURRIER, SECRETARY

SEAL

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR THE AMENDMENT OF ORDER NO. R-110 RELATING TO THE BLANCO-MESAVERDE POOL, SAN JUAN COUNTY, NEW MEXICO.

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DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Edwin L. Mechem
EDWIN L. MECHEM, CHAIRMAN

Guy Shepard
GUY SHEPARD, MEMBER

R. R. Spurrier
R. R. SPURRIER, SECRETARY

SEAL

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

1220

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter

NL=Night Letter

LT=Int'l Letter Telegram

VLT=Int'l Victory Ltr.

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

LA17 SSC939

L WLA331 NL PD=WEST LOS ANGELES CALIF 17= 1951 DEC 17 PM 10 47

OIL CONSERVATION COMMISSION, DLR BEFORE 10 AM =

=FOR STATE OF NEX MEXICO MABRY HALL= STATE CAPITOL

SANTA FE NMEX=

:STANOLIND PETITION FOR GAS PRORATION IS SO MEAGER AND LACKING IN WORKING DETAILS THAT NO CONSIDERATION SHOULD BE GIVEN IT STOP I AM HOLDER OF SEVERAL FEDERAL LEASES IN BLANCO AREA AND AM INTERESTED IN TWO POINT LOOKOUT GAS WELLS I RESPECTFULLY SUGGEST MUCH DETAIL STUDY AND MANY FORMULAE BE WORKED OUT BEFORE CONSIDERING ANY METHOD OF PRORATION STOP AS A MEMBER OF CONSERVATION COMMITTEE OF CALIFORNIA OIL PRODUCERS FOR MORE THAN FIFTEEN YEARS UNTIL 1948 I SAW GREAT NUMBER OF FORMULAE WHICH APPERARED FAIR IN PRINCIPAL WORKED OUT BEFORE USING BRING OUT FANTASTIC RESULTS WITH MANY GROSS INEQUITIES STOP MANY FACTORS MUST BE GIVEN WEIGHT NAMELY PRESSURES OF DIFFERENT FORMATIONS ECONOMICS COST OF WELLS GAS GATHERING LINE PRESSURES GOVERNMENT LIMITATIONS OF RAYALTIES AND MANY OTHERS STOP PRORATION OF GAS PRODUCTION DOES NOT APPEAR WARRANTED FOR MANY YEARS BUT IF ADDED TO PRESENT HIGH GAS LINE PRESSURES THE INCENTIVE TO DRILL GAS WELLS IS GONE STOP WOULD BE GREAT SET BACK TO SAN JUAN BASIN I AM UNALTERABLY OPPOSED TO STANOLIND PETITION=

:LAWRENCE C KELLY=

Case 330

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

1220

W. P. MARSHALL, PRESIDENT

SYMBOLS

DL=Day Letter

NL=Night Letter

Int'l Letter Telegram

T=Int'l Victory Ltr.

(153)

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

1951 DEC 17 AM 10

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K TUB099 PD=PC TULSA OKLA 17 1024A=

:NEW MEXICO OIL AND GAS CONSERVATION COMMISSION=

SANTAFE NMEX=

:RE: CASE NUMBER 330, DECEMBER 18, 1951 STANOLIND APPLICATION TO MAKE MORE DEFINITE AND CERTAIN RULES APPLICABLE TO BLANCO-MESAVERDE GAS FIELD, SN JUAN COUNTY

¶ THIS COMPANY NORMALLY FAVORS ADOPTION OF RULES PROVIDING FOR EQUITABLE GAS ALLOCATION WHERE SUFFICIENT PRODUCTION AND RESERVOIR INFORMATION IS AVAILABLE. WE HAVE TWO WELLS ON APPROXIMATELY 6700 ACRES IN BLANCO FIELD AND THEREFORE IN ABSENCE OF SUCH INFORMATION HAVE NO RECOMMENDATIONS TO MAKE AT THIS TIME=

SUNRAY OIL CORP WILLIAM L HORNER CHIEF ENGINEER=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

NOTICE OF PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice pursuant to law and the rules and regulations of said Commission promulgated thereunder of the following hearing to be held December 18, 1951, beginning at 10 a.m. on that day at Mabry Hall (the new capitol office building) in the City of Santa Fe, New Mexico.

STATE OF NEW MEXICO TO:

All parties and persons having any right, title, interest or claim in the following case or the subject matter thereof, and notice to the public.

CASE 330:

Notice is hereby given by the Oil Conservation Commission of New Mexico that a hearing will be held in relation to the Blanco (Mesa-verde) gas pool, located in San Juan County, New Mexico, at Mabry Hall, Santa Fe, New Mexico, Capitol Building,/on the 18th day of December, 1951, at 10 a.m., upon the petition of Stanolind Oil and Gas Company for an order by the Commission to the following effect:

A. To make more definite and certain Section II of Order No. 799 of the Commission dated March 7, 1949, requiring the equitable production by proration units of wells in the pool, in which petition it is proposed that the following be adopted as an equitable standard:

1. That as a permanent standard commencing with the calendar year 1953 each well be allowed to produce an amount of gas based on the tested deliverability of the well against a uniform back pressure to be fixed by the Commission (but not less than the average working pressure of the pipe lines) multiplied by acreage as compared with the aggregate deliverability times acreage of all connected wells in the pool, such standard to be applied at the end of the year to the average daily production of the pool during said year.

2. In order to permit pipe lines to supply a fluctuating market demand, a tentative allowable shall be fixed at the beginning of 1953 and each subsequent year on the above standard as applied to the wells connected to each pipe line, subject to adjustment at the end of the year as set out on (1) supra.

3. That as a temporary standard for the calendar year 1952 each well shall be allowed to produce an amount of gas based on the tested open flow capacity of the well as compared with the open flow capacity of all connected wells in the pool, such standard to be applied at the end of the year to the average daily production of the pool for that year.

4. In order to permit pipe lines to supply seasonal market demand, a tentative allowable shall be fixed at the beginning of 1952 on the above standard (3) as applied to the wells connected to each pipe line, subject to adjustment at the end of the year as set out in (3) supra.

5. Each well having an underage in any calendar year shall be allowed to make it up during the next calendar year in addition to its regular allowable.

6. Each well having an overage in any calendar year shall restrict its allowable production during the next year to the extent necessary to equalize the overage, in default of which the Commission will shut in the well until the overage is equalized.

7. That provision be made for pipe line nominations, time and manner of making well tests, reports and other detailed matters.

B. To extend the boundaries of the Blanco (Mesaverde) pool, as heretofore defined and described, and make subject to the provisions of Order No. 799, being the Blanco (Mesaverde) pool rules, as they now exist or may hereafter be amended, the following described lands:

Township 29 North, Range 8 West
Sections 1, 2, 3, 12 and 13

Township 30 North, Range 8 West
Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, 36

Township 31 North, Range 8 West
Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

to include gas wells producing from the Mesaverde formation from a pool or accumulation common to lands now included within the Blanco (Mesaverde) pool.

Given under the seal of the Oil Conservation Commission at Santa Fe, New Mexico, this 15th day of November, 1951.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. SPURRIER, SECRETARY

SEAL

Case 330

P. O. Box 1410
Fort Worth, Texas
February 4, 1952

Mr. R. R. Spurrier
Oil Conservation Commission of New Mexico
Santa Fe, New Mexico

Dear Dick:

In accordance with your suggestion, I am transmitting a proposed draft of a Blanco order which has been prepared by J. K. Smith.

You will note that in lieu of the type of order which we discussed verbally, the attached order merely continues the Blanco hearing until October 21, 1952. It was our thought that this would be the simplest means of handling the matter and would indicate that the Commission was retaining jurisdiction. This will probably forestall any action by other agencies.

If you would prefer to issue an order along the lines we had previously discussed or if you have any questions about the attached order, please call me collect in Fort Worth.

Yours very truly,

Lewis H. Bond

LHB:dhs
Attachment

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
FEB 7 1952

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE NO._____
ORDER NO._____

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW MEXICO
FOR THE PURPOSE OF CONSIDERING:

THE APPLICATION OF STANOLIND OIL AND
GAS COMPANY FOR THE AMENDMENT OF ORDER NO.
799 ESTABLISHING THE PRODUCING AREAS OF
THE BLANCO MESAVERDE POOL AND PROVIDING
FOR THE EQUITABLE PRODUCTION OF WELLS.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 10:00 A.M. on December 18, 1951, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission", all members being present.

NOW, this_____day of_____, 1952, the Commission, a quorum being present, having considered the testimony adduced and exhibits received at said hearing, and being fully advised in the premises;

FINDS: (1) That due public notice having been given as required by law, the Commission has jurisdiction in this cause and the subject matter thereof.

(2) That the evidence supports the extension of the boundaries of the Blanco (Mesaverde) Pool in accordance with the application of Stanolind Oil and Gas Company.

(3) That the evidence does not indicate any present waste of gas nor any present injury to correlative rights of interested parties in the Blanco (Mesaverde) Pool; however, the Commission recognizes the possibility of such waste or injury to correlative rights occurring with additional development of the field.

IT IS THEREFORE ORDERED:

That effective as of the date of this order that the lands hereinafter described in this Order are within the producing limits of the Blanco (Mesaverde) Pool, which

said pool is a common source of supply of natural gas, and that the Mesaverde gas producing pool in the Blanco area as established by Order No. 799 of this Commission, as amended, be enlarged to define and include the following described land in San Juan County, New Mexico:

Township 29 North, Range 8 West:

Sections 1, 2, 3, 12, and 13

Township 30 North, Range 8 West:

Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 27, 34, 35, and 36

Township 31 North, Range 8 West:

Sections 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36

IT IS FURTHER ORDERED:

That the hearing with respect to the necessity for allocating the production of gas in the Blanco (Mesaverde) Pool, and the formulation of rules governing such allocation of gas be adjourned until October 21, 1952, without prejudice to the rights of any interested parties in making application for such relief as may be deemed necessary in the interim.

DONE at Santa Fe, New Mexico, on the date and year hereinabove written.

_____

_____

_____

CASE ~~330~~ Re Stanolind Oil & Gas Co.'s application for proration of gas in Blanco Pool 3304 1951

Case No.

330-330-A

Application, Transcript,
Small Exhibits, Etc.

CASE 330: (Continued Case) Stanolind's application for proration of natural gas in the Blanco-Mesaverde Pool, San Juan County, New Mexico, and has been successively continued to permit the compilation of production data.

TRANSCRIPT OF HEARING
September 17, 1953

BEFORE: Honorable E. S. Walker, Land Commissioner
Honorable R. R. Spurrier, Secretary-Director, OCC

STATE OF NEW MEXICO)
COUNTY OF SANTA FE) ss.

I HEREBY CERTIFY That the within transcript of proceedings before the Oil Conservation Commission is a true record of the same to the best of my knowledge, skill and ability.

DONE at Santa Fe, New Mexico, this 21st day of September, 1953

Virginia M. Chavez
Virginia M. Chavez
Notary - Reporter

My Comm. Ex.:
August 8, 1956

CASE 330: (a continued case)

(Mr. Graham reads the advertisement.)

MR. CHAIRMAN: Quilman Davis, representing Southern Union Gas Company. With the consent of Stanolind Oil & Gas Company, applicant in this case, we would like to make a statement and present the Commission information we have concerning these negotiations in the Blanco field of San Juan County and the entire San Juan Basin, whereby we think that we can work out on a voluntary basis, ratable withdrawals from those wells in the San Juan Basin. As I told the Commission in August, we were negotiating with El Paso contracts that would permit us to deliver gas to them in the Blanco field. Shortly after the first of September those contracts were completed and the contract was made between El Paso Natural Gas Company and Southern Union Gathering Company, subsidiary created by Southern Union to take over the gathering of Natural gas in a three township area in Townships 29, 30 and 31 North, Ranges 8, 9, and 10 West. Southern Union Gathering Company will take over operation of approximately 80 wells or more and eventually perhaps we'll have a hundred, connected to its systems. It in turn will deliver gas to El Paso Natural Gas Company in the field and this operation will relieve Southern Union Gas Company from the obligation to purchase based upon 1952 figures, of some 6 or 7 billion from this particular area while, in affect that represents about one-third of Southern Union Gas Company's requirements from the area during 1952. Now, with this, high falluted transaction in this case, we expect very shortly to be able to increase the withdrawals from our other

wells in the San Juan Basin area by 50%. We, of course are going to be experimenting with this for some time in an effort to work out ratable withdrawals. We feel like that it will take some time to do that.

MR. SPURRIER: Excuse me, Mr. Davis - when you say other wells in the San Juan Basin, do you mean Pictured Cliffs production in addition to Mesaverde?

A. We hope that eventually this program will make an equitable withdrawal or ratable withdrawal from all wells in the San Juan Basin. The arrangements with El Paso are general and provide that El Paso will attempt to take from us in the Mesaverde-Blanco field gas, which will in effect give a ratable withdrawal from all wells connected to Southern Union Gathering Company's system between the wells connected to the El Paso system in the entire San Juan Basin. Now, that includes Mesaverde as well as Pictured Cliffs wells. As I have stated what we have done in affect here is set up the vehicle by which the two pipeline companies are operating at the present time may make exchanges of gas in the field and thereby help a ratable withdrawal. Now, we know that this can't be done over night and I think most of the operators realize that it can't be done overnight. We are attempting to make this retroactive - this withdrawal retroactive to September 1, 1953. Further, it's possible that this gathering company will be increased as experience shows Southern Union and El Paso that additional deliveries need to be made to get ratable take. Now, there's still an awful lot of development particularly in the Mesaverde section up there and as far as we know there is no gas being

flared and we think that immediate rules of proration would be definitely inadvisable right now and we are asking the Commission to, both Southern Union and El Paso, for a year or we prefer to have it until October or November of next year as a trial period with which we can experiment with the takes and the matter of allocation to work out a ratable withdrawal.

MR. SPURRIER: Are there any questions of this gentleman?

MR. HILTZ: R. G. Hiltz for Stanolind. I would like to advise the Commission that Stanolind is in agreement with the conclusions that have been reached by El Paso and Southern Union. We believe they have a workable plan and we strongly urge the Commission to approve the request of Southern Union for at least continuance of this program until October or November of next year to determine whether or not it will ultimately represent the most feasible plan for ratable take in the field.

MR. SPURRIER: Any one else to be heard?

MR. ZINN: Frank Zinn, Attorney at Santa Fe. I represent Kingsley-Locke, King Lock & Quemado Production Companies, small independent operators in the Blanco-Mesaverde area. I wish to state in their behalf the same objections that were raised a year ago which is principally that there is not sufficient data or information to base any proper proration on our situation. The three companies have 28 wells up there, some of them are not even tied in yet. They've not completed deliverability tests up there and it is our view that any proration consideration at this time is premature by - as Mr. Davis says - a year or more.

We ask that this whole matter be deferred until such time as further development and further statistics are available and one further thing we'd like to ask in behalf of at least the independents we represent that if these negotiations by Southern Union and El Paso are to be something of record and information available to the Commission, we ask that the independent be notified of it. The small operators won't know what's happened to them until the Commission meeting next year unless we are advised. Thank you.

MR. SPURRIER: Is there anyone else to be heard?

MR. HOWELL: My name is Ben Howell. I am representing the El Paso Natural Gas Company in this matter. The El Paso Natural Gas Company concurs with Southern Union in the application for continuance for a year - a year and a month or two which would permit two six month's periods in which the two companies can work out balancing procedures on the wells that are connected. In that connection we know of no flaring of gas taking place or waste in that area. We do know that there will be substantial work necessary out in the field in making a workable ratable take. We do know that there are dozens of wells that will be concluded within this next year, probably as many as five hundred. We do know that there are dozens of wells which the tie-in crews haven't gotten to yet and won't get to for some time, and we think that any attempt to set proration at this particular time will be premature.

MR. SPURRIER: Is there any one else?

MR. CHAIRMAN: Trevor Reese Jones representing Delhi Oil

Corporation. As you know, Delhi is one of the major producers in the Blanco-Mesaverde pool. We have been vitally concerned in the negotiations between El Paso and Southern Union and have been a party to certain of the negotiations. We have a new contract with Southern Union Gathering, dated August 31, 1953 which went into effect September 1, 1953. We are eminently satisfied with this contract and believe that it will take probably as Mr. Davis said, a year to compile data and determine whether or not there is a ratable take - that is the keynote of the contract and we are satisfied with it. We therefore, concur in the request of Mr. Davis and Stanolind for a postponement of this case until the November 1954 hearing.

MR. SPURRIER: Is there anyone else? If not, we will take the case under advisement and we will take a five minute recess.

SKELLY #8
EXH

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. ____
CASE ____

Texas Gas Proration Formulas

District 1

Imogene, East		A		
Jake Hammon	2/3	AxBHP	1/3	W
Loma Alta Wilcox "B"	1/2	A	1/2	W

District 2

Albrecht	1/2	A	1/2	W
Arneckeville	2/3	A	1/3	W
Boyce		A		
Caesar, South		A		
Cologne, West	2/3	AxRP	1/3	W
Cordele, West	1/2	A	1/2	W
Coy City		AxBHP		
George West, West		AxBHP		
Goree Slick Wilcox	2/3	A	1/3	W
Gottschalt		AxBHP		
Harris (Wilcox)	2/3	A	1/3	BHP
Henze	2/3	GAF	1/3	W
Jennie Bell	2/3	A	1/3	W
Karons, South	2/3	A	1/3	W
Kittie West	2/3	A	1/3	BHP
Long Mott, South	2/3	AxBHP	1/3	W
Mary Ellen O'Connor		AxBHP		
McFaddin, North	1/2	A	¼ Pt ¼	W
Oakville (Wilcox)	2/3	A	1/3	BHP
Placedo (5300 zone)	1/2	AxBHP	1/2	W
Plummer - Wilcox		AxBHP		
Refugio - Hynes		AxBHP		
Sheriff, East		AxBHP		
Slick - Wilcox		A		
Welder Ranch (5300 zone)		AxBHP		

District 3

Ace, First Wilcox	2/3	A	1/3	W
Alief	3/4	AxRP	1/4	Pt
Alvin City		AxBHP		
Amelia	3/4	A	1/4	W
Bay City, East		AxBHP		
Beaumont, West	2/3	AxBHP	1/3	W
Blue Lake	2/3	AxRP	1/3	Pt
Castillo	2/3	A	1/3	W
Cold Springs	2/3	A	1/3	W
Deckers Prairie		AxBHP		
Echo		AxBHP		
Evergreen	1/2	A	1/2	W
Fairbanks, Southwest	2/3	A	1/3	W
Fulshear	1/2	A	1/2	W
Hampton, South	2/3	AxBHP	1/3	W
Hamshire, West		A		
Jackson Pasture, East	1/2	AxBHP	1/2	W
Lick Branch	2/3	A	1/3	W
Louise, North	2/3	AxRP	1/3	Pt.
Louise, West		AxBHP		
Madisonville		AxBHP		
McCoy	2/3	AxRP	1/3	Pt
Needville	3/4	A	1/4	W
Niels Carlsen		AxBHP		
Nona Mills		AxBHP		
Old Ocean		AxBHP		
Pelican	2/3	A	1/3	W
Prasifka		AxBHP		
Spanish Camp		AxRP		
Spindletop, North	3/4	A	1/4	W
Spurger		AxBHP		
Sublime	2/3	A	1/3	W
Sugar Valley		NAF		
Village Mills, East		AxBHP		

District 4

Brayton		A		
Callaboose	2/3	AxRP	1/3	W
Cinco de Mayo		A		
Goose Island	2/3	A	1/3	W
Hagist Ranch		A		
Harvey		AxBHP		
La Blanca		AxBHP		
Lacy		AxBHP		
La Sal Vieja		AxBHP		
Luby	2/3	A	1/3	BHP
Minnie Bock, North		AxRP		
Murdock Pass	2/3	A	1/3	W
Mustang Island		AxBHP		
Odem	2/3	A	1/3	W
Red Fish Bay, North	3/4	A	1/4	W
Riverside	1/2	AxRP	¼W	¼D
Rooke	2/3	AxBHP	1/3	D
Sinton Shallow, West	1/2	A	1/2	W
Starr County, Northeast	2/3	AxBHP	1/3	W
Stedman Island	3/4	A	1/4	W
Sun		NAF		
Tobasco	2/3	A	1/3	W
Taft, West		A		
Tiger		AxRP		
Triple "A" Frio		A		
Weslaco, South		AxBHP		
White Point, East	2/3	A	1/3	W

District 5

Oakwood		A		
Teague		AxBHP		
Teague, West	2/3	AxBHP	1/3	W
Tri-Cities	1/2	A	1/2	Pt

District 6

Bethany	2/3	A	1/3	W
Bobby Joe		AxBHP		
Carthage		AxBHP		
Elysian Fields		AxBHP		
Hallsville, South	2/3	AxRP	1/3	W
Huxley		AxBHP		
Jacksonville		AxRP		
Joaquin	2/3	A	1/3	W
Lansing, North		AxBHP		
Minden		AxBHP		
Navarro Crossing		A		
Prairie Lake	2/3	A	1/3	W
Red Springs		AxBHP		
Trawick		AxBHP		
Tyler, South		AxBHP		
Waskom		AxBHP		

District 6 (Continued)

Willow Springs	AxBHP
Winnsboro	AxBHP
Woodlawn	AxBHP
Yantis	AxBHP

District 7-B

Lazy Bend	AxD
Nimrod	3/4 A 1/4 W
Sipe Springs	1/2 AxRP 1/2 D
Trammel	AxBHP

District 7-C

Benedum	A
Eden	1/2 AxRP 1/2 D

District 8

Weiner	AxBHP

District 9

Boonsville	AxBHP
Cottondale	AxBHP

District 10

Panhandle, East	1/2 A 1/2 Pt
Panhandle, West	2/3 AxRP 1/3 Pt
Texas Hugoton	AxD

Key to Symbols

A	-	Acres
D	-	Deliverability
W	-	Well
Pt	-	Potential
RP	-	Rock Pressure
BHP	-	Bottom Hole Pressure
GAF	-	Gross Acre-Feet
NAF	-	Net Acre-Feet

Acreage and Well Formulae:

	A		13
1/2	A	1/2 W	6
2/3	A	1/3 W	19
3/4	A	1/4 W	6
			44

Bottom Hole Pressure Formulae:

	AxBHP		45
1/2	AxBHP	1/2 W	2
2/3	AxBHP	1/3 W	6
1/3	BHP	2/3 A	4
			57

Rock Pressure Formulae:

	AxRP		4
2/3	AxRP	1/3 W	3
			7

Potential Formulae:

1/2	Pt.	1/2 A	2
1/4	Pt.	3/4 AxRP	1
1/3	Pt.	2/3 AxRP	4
1/4	Pt.	1/2 A 1/4 W	1
			8

Deliverability Formulae:

	AxD		2
1/2	D	1/2 AxRP	2
1/3	D	2/3 AxBHP	1
1/4	D	1/2 AxRP $\frac{1}{4}$W	1
			6

Acre-Foot Formulae:

	NAF		2
2/3	GAF	1/3 W	1
			3

Total 125

SKELLY EXH #9

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No.
CASE

PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

Case No.

330 & 330A

Application, Transcript,
Small Exhibits, Etc.

Shell C / HS

Texas Gas Proration Formulas

District 1

Imogene, East		A		
Jake Hammon	2/3	AxBHP	1/3	W
Loma Alta Wilcox "B"	1/2	A	1/2	W

District 2

Albrecht	1/2	A	1/2	W
Arneckeville	2/3	A	1/3	W
Boyce		A		
Caesar, South		A		
Cologne, West	2/3	AxRP	1/3	W
Cordele, West	1/2	A	1/2	W
Coy City		AxBHP		
George West, West		AxBHP		
Goree Slick Wilcox	2/3	A	1/3	W
Gottschalt		AxBHP		
Harris (Wilcox)	2/3	A	1/3	BHP
Henze	2/3	GAF	1/3	W
Jennie Bell	2/3	A	1/3	W
Karons, South	2/3	A	1/3	W
Kittie West	2/3	A	1/3	BHP
Long Mott, South	2/3	AxBHP	1/3	W
Mary Ellen O'Connor		AxBHP		
McFaddin, North	1/2	A	½ Pt	½ W
Oakville (Wilcox)	2/3	A	1/3	BHP
Placedo (5300 zone)	1/2	AxBHP	1/2	W
Plummer - Wilcox		AxBHP		
Refugio - Hynes		AxBHP		
Sheriff, East		AxBHP		
Slick - Wilcox		A		
Welder Ranch (5300 zone)		AxBHP		

District 3

Ace, First Wilcox	2/3	A	1/3	W
Alief	3/4	AxRP	1/4	Pt
Alvin City		AxBHP		
Amelia	3/4	A	1/4	W
Bay City, East		AxBHP		
Beaumont, West	2/3	AxBHP	1/3	W
Blue Lake	2/3	AxRP	1/3	Pt
Castillo	2/3	A	1/3	W
Cold Springs	2/3	A	1/3	W
Deckers Prairie		AxBHP		
Echo		AxBHP		
Evergreen	1/2	A	1/2	W
Fairbanks, Southwest	2/3	A	1/3	W
Fulshear	1/2	A	1/2	W
Hampton, South	2/3	AxBHP	1/3	W
Hamshire, West		A		
Jackson Pasture, East	1/2	AxBHP	1/2	W
Lick Branch	2/3	A	1/3	W
Louise, North	2/3	AxRP	1/3	Pt.
Louise, West		AxBHP		
Madisonville		AxBHP		
McCoy	2/3	AxRP	1/3	Pt
Needville	3/4	A	1/4	W
Niels Carlsen		AxBHP		
Nona Mills		AxBHP		
Old Ocean		AxBHP		
Pelican	2/3	A	1/3	W
Prasifka		AxBHP		
Spanish Camp		AxRP		
Spindletop, North	3/4	A	1/4	W
Spurger		AxBHP		
Sublime	2/3	A	1/3	W
Sugar Valley		NAF		
Village Mills, East		AxBHP		

District 4

Brayton		A		
Callaboose	2/3	AxRP	1/3	W
Cinco de Mayo		A		
Goose Island	2/3	A	1/3	W
Hagist Ranch		A		
Harvey		AxBHP		
La Blanca		AxBHP		
Lacy		AxBHP		
La Sal Vieja		AxBHP		
Luby	2/3	A	1/3	BHP
Minnie Bock, North		AxRP		
Murdock Pass	2/3	A	1/3	W
Mustang Island		AxBHP		
Odem	2/3	A	1/3	W
Red Fish Bay, North	3/4	A	1/4	W
Riverside	1/2	AxRP	½W	½D
Rooke	2/3	AxBHP	1/3	D
Sinton Shallow, West	1/2	A	1/2	W
Starr County, Northeast	2/3	AxBHP	1/3	W
Stedman Island	3/4	A	1/4	W
Sun		NAF		
Tobasco	2/3	A	1/3	W
Taft, West		A		
Tiger		AxRP		
Triple "A" Frio		A		
Weslaco, South		AxBHP		
White Point, East	2/3	A	1/3	W

District 5

Oakwood		A		
Teague		AxBHP		
Teague, West	2/3	AxBHP	1/3	W
Tri-Cities	1/2	A	1/2	Pt

District 6

Bethany	2/3	A	1/3	W
Bobby Joe		AxBHP		
Carthage		AxBHP		
Elysian Fields		AxBHP		
Hallsville, South	2/3	AxRP	1/3	W
Huxley		AxBHP		
Jacksonville		AxRP		
Joaquin	2/3	A	1/3	W
Lansing, North		AxBHP		
Minden		AxBHP		
Navarro Crossing		A		
Prairie Lake	2/3	A	1/3	W
Red Springs		AxBHP		
Trawick		AxBHP		
Tyler, South		AxBHP		
Waskom		AxBHP		

District 6 (Continued)

Willow Springs	AxBHP
Winnsboro	AxBHP
Woodlawn	AxBHP
Yantis	AxBHP

District 7-B

Lazy Bend	AxD
Nimrod	3/4 A 1/4 W
Sipe Springs	1/2 AxRP 1/2 D
Trammel	AxBHP

District 7-C

Benedum	A
Eden	1/2 AxRP 1/2 D

District 8

Weiner	AxBHP

District 9

Boonsville	AxBHP
Cottondale	AxBHP

District 10

Panhandle, East	1/2 A 1/2 Pt
Panhandle, West	2/3 AxRP 1/3 Pt
Texas Hugoton	AxD

Key to Symbols

A	-	Acres
D	-	Deliverability
W	-	Well
Pt	-	Potential
RP	-	Rock Pressure
BHP	-	Bottom Hole Pressure
GAF	-	Gross Acre-Feet
NAF	-	Net Acre-Feet

Acreage and Well Formulae:

A		13
1/2 A	1/2 W	6
2/3 A	1/3 W	19
3/4 A	1/4 W	6
		44

Bottom Hole Pressure Formulae:

AxBHP		45
1/2 AxBHP	1/2 W	2
2/3 AxBHP	1/3 W	6
1/3 BHP	2/3 A	4
		57

Rock Pressure Formulae:

AxRP		4
2/3 AxRP	1/3 W	3
		7

Potential Formulae:

1/2 Pt.	1/2 A	2
1/4 Pt.	3/4 AxRP	1
1/3 Pt.	2/3 AxRP	4
1/4 Pt.	1/2 A 1/4 W	1
		8

Deliverability Formulae:

AxD		2
1/2 D	1/2 AxRP	2
1/3 D	2/3 AxBHP	1
1/4 D	1/2 AxRP 1/4 W	1
		6

Acre-Foot Formulae:

NAF		2
2/3 GAF	1/3 W	1
		3

Total 125

Slope Sheet

P_c = 625 PSIA P_w = 340 psia P_L = 240 psia Q = 1891 MCFD

P_c Psig	P_c^2 psia (Thsnds)	P_L psig	P_L^2 PSIA (Thsnds)	$P_c^2 - P_L^2$ psia (Thsnds)	Q @ 250 psig line
615					
625	1051.8	240	63.6	337.2	1192
600	360.0	"	"	291.4	1091
575	330.6	"	"	262	996
550	302.5	"	"	233.0	900
525	275.6	"	"	207.2	835
500	250.0	"	"	181.4	789
450	202.5	"	"	133.9	705
400	160.0	"	"	91.4	602
350	122.5	"	"	53.9	495
300	90.0	"	"	21.4	411
250	63.6	"	"	0	255

A. Well Average

Current-year Rel./d	A (Mcf)	483 -	358 -	315		258 -
Last-year Rel./d	A (Mcf)	353	315	258		214 -
Close. Rel/d	A (Mcf)	441 - 443	335 - 337	259 - 263		233 - 237
Annual Production	(Mcf)	162,0	122,2	104 -		85 -
Cummulative Prod.	(Mcf)	162,0	289,2	388 -		473 -
		164	575	412		
		246	331 7	423		

Delhi's Net per well

B. Annual Prod. 726 wells

(Continued on next page)

1. Gross
   (a) 8/8's Annual
   (b) 8/8's Accum.
2. Delhi's Net
   (a) Annual
   (b) Accum.

Production Log

Date	Production	Remarks
Initial	psig	
Avg.	55 "	
Cum.	4.032 MCF/Acre	
	258.120 MCF per 40 Ac.	

P.C. Testing [illegible]

P_W = 3115

P_L psig	P_L + 12 psia	P_L = 250	P_L + 12	P_L	$P_L - P_1$ (Flow A Pseudo)	Q @ 250 psia Lbs
639	123.8	250	11	6	3552	229
600	374.5	11	11	6	3059	202
550	315.8	11	11	6	2472	165
525	288.3	11	11	6	2197	152
500	262.1	11	11	6	1925	136
450	212.9	11	11	6	1443	107
400	169.7	11	11	6	1011	79
350	131.0	11	11	6	624	52.5
300	97.3	11	11	6	287	24.5
250	68.6	11	11	6	0	
		P_L = 150				
639	423.8	150 + 12		26.2	3976	252
600	374.5	150 + 12		26.2	3483	223
550	315.8	11	11	6	2896	192
525	288.3	11	11	6	2621	177
500	262.1	11	11	6	2359	163
450	212.9	11	11	6	1867	133
400	169.7	11	11	6	1435	109
350	131.0	11	11	6	1048	82
300	97.3	11	11	6	711	59
250	68.6	11	11	6	423	38
200	44.9	11	11	6	187	19.2
150	26.2	11	11	6	0	
		P_L = 50				
639	123.8	50 + 12		3.8	4200	264
600	374.5	11	11	6	3707	237
550	315.8	11	11	6	3120	204
500	262.1	11	11	6	2583	174
450	212.9	11	11	6	2091	146
400	169.7	11	11	6	1659	121
350	131.0	11	11	6	1272	96
300	97.3	11	11	6	935	74.2
250	68.6	11	11	6	648	54.5
200	44.9	11	11	6	411	37.1
150	26.2	11	11	6	224	22.5
100	12.5	11	11	6	87	12
50	5.5	11	11	6	0	

Recorded Pitot Data

P_c psig	P_c^2 psia (Thsnds)	P_L psig	P_L^2 psia thsnds	$P_c^2 - P_L^2$ (Thsnds)	Q
1036	1098.3	500	262.1	836.2	795
1000	1024.1	"	"	762.0	741
950	925.4	"	"	663.3	627
900	831.7	"	"	569.6	596
850	743.0	"	"	480.9	523
800	659.3	"	"	397.2	455
750	580.6	"	"	318.5	384
700	506.9	"	"	244.8	310
650	438.2	"	"	176.1	247
600	374.5	"	"	112.4	176
550	315.8	"	"	53.7	102
500	262.1	"	"	0	0
1036	1098.3	300	97.3	1000.0	916
1000	1024.1	"	"	926.8	862
950	925.4	"	"	828.1	788
900	831.7	"	"	734.4	720
850	743.0	"	"	645.7	657
800	659.3	"	"	562.0	591
750	580.6	"	"	483.3	530
700	506.9	"	"	409.6	465
650	438.2	"	"	340.9	407
600	374.5	"	"	277.2	347
550	315.8	"	"	218.5	291
500	262.1	"	"	164.8	234
450	213.4	"	"	116.1	183
400	169.7	"	"	72.4	127
350	131.0	"	"	33.7	72
300	97.3	"	"	0	0
1036	1098.3	100	12.5	1085.8	765
1000	1024.1	"	"	1011.6	720
950	925.4	"	"	912.9	656
900	831.7	"	"	819.2	780
850	743.0	"	"	730.5	717
800	659.3	"	"	646.8	654
750	580.6	"	"	568.1	577
700	506.9	"	"	494.4	527
650	438.2	"	"	425.7	481
600	374.5	"	"	362.0	421

P_c psig	P_c^2 psia	P_L psig	P_L^2 psia	$P_c^2 - P_L^2$	Q
550	315.9	100	12.5	3033	372
500	262.1			2492	320
450	213.4			2009	252
400	169.7			1572	227
350	131.0			1185	182
300	97.3			848	193
250	68.6			561	105
200	44.9			324	70
150	26.2			137	385
100	12.5			0	0

Short Radius (Horizontal Hole Angle) (Dev.)

	Hole	Decl. S.I.	Obs.
Kodiak	96	10°48'35"	10°56'5"
Chignik	417	11°3'45"	10°61'7"
	513	61°7'18"	(10°62'4")

Formula for conductor 500 psig Line or (Pw)

$$D = Q \sqrt{\frac{(1067^2 - 513^2)}{(1067^2 - P_w^2)}}^{.75}$$

$$D = S \sqrt{\frac{.75}{\left(1 - \frac{P_c}{P_w}\right)\left(1 + \frac{P_c}{P_w}\right)}}^{.75}$$

Correction for Projection. (Park on 2-1/4 in. P/4T

4-B-B'

S.P. N.S. Pedestal - SW3-30N-9W

T.P. 3,250 El. 6091 D.F.

D.E.L. NET PAY C.H. 50 PL 60 = 110

Kodiak N.P. Structure NE 3-30N-9W

T.P. 5620 - El. 6162 D.F. NET PAY CH 55
PL 50
05

D.E.L.

T.P. Structure 2 Hole NE 2-30-9

T.P. 6880 El. 5908 NET PAY C.H. 60
PL. 55
115

7'435 T.D. Hole = 4245 Mkr. Sec P 1106-130a.

Kodiak N.P. Platform SW 1-30-9

T.P. 3235 El. 5×91 D.F.

D.E.L. N-1 Kodiak C.H. 60
55
115

A-A'

T.P. & S.P. Structure NE 11-30-9

T.P. [illegible] El. [illegible]

D.E.L. [illegible] C.H. [illegible]

[illegible] SW [illegible]-9

[illegible] NET PAY C.H. 25
PL 55
120

[illegible] SW-24-[illegible]

[illegible] T.P. [illegible] D.F.

[illegible] 65

(over)

1 Gas Well [illegible]

SW-2-30-9

Casing 4938

T.P. 2011 = 575 Gas Hole T.D. [illegible] in P.L.

No Tops Available

D.P. 2005 Lat.

SICP 1095-6 da.

Anderson-Richard-Johnston #5 - NE 35-31-9

W.O.

EPG&E Riddle #3 - NE 10-30-9

125

Delhi-Florence 1-18 - SW 11-30-8

Ext. 130

$$P_w = \sqrt{P_{wf}^2 + R^2}$$

$$P_w = \sqrt{P_{wf}^2 + \frac{\text{Casing}}{\text{Tubing}} \times R^2}$$

		Reading on C-12215			Computed
		Casing	Tubing	Tubing size	Pw Casing Number
1.	Riddle 1-G.	697	559		

		No. Wells	El Paso Prod. Tot. Da/Ave	El Paso Del. Tot. da. Ave.	Del. Load Factor	No. Wells	So. Union Prod. Tot. Da. Ave	So. Union Del. Tot. Da. Ave	Del. Load Factor
1	0–199 da. Ave	44	3073 69.8	5266	193	9	862 95.7	1077	.804
2	200–399	31	6448 208.0	9537	676	15	1889 125.9	4329	.436
3	400–599	36	10996 305.4	17457	629	4	1048 262.0	2151	.487
4	600–799	34	14529 427.3	23708	612	8	3238 404.7	5325	.608
5	800–999	35	22560 644.5	31854	708	7	3223 460.4	6080	.530
6	1000–1199	18	12791 710.6	19512	6555	2	1236 618	2311	.535
7	1200–1399	21	20012 958	28364	705	1	800	1206	.663
8	1400–1599	9	7469 829.8	13204	562	0			
9	1600–1799	12	13336 1111.	20348	655	1	621	1790	.346
10	1800–1999	13	17490 1345.4	25035	698	1	602	1872	.321
11	2000–2199	5	6013 1202.6	10584	570	1	509	2044	.249
12	2200–2399	1	1105 1105	2270	486	0			
13	2400–2599	2	3542 1771.0	4961	713	0			
14	2600–2799	3	3850 1283.3	8006	480	0			
15	2800–2999	1	1698 1698	2863	593	1	1026	2780	.369
16	3000–3499	2	2981 1490.5	6169	483				
	3500–3999	0							
	4000–4499	0							
17	4500–4999	1	1724	4964	347				
18	5000–5499	1	2452	5602	437				
19	6000–6499					2	2746 1373	12832	.214
20	7000–7499	2	7440 3720.0	14928	498				
21	8000–8999	0				1	500	5720	.091
22	[illegible]	1	2813	6163	421				
23	[illegible]	[illegible]	[illegible]	15625	394				
		273				53			

Reservoir Calculations for Completion
on Pressure Curve 3201 Area of B.O.N-9 W. Beach.

Turner-Slate "1"-SW 2-30-9

Reservoir Temp. CH. 147 + PL 160 ÷ 153 A.F. + 460 = 613 °R.

Sp. Gravity .665

Column Length $7123 - 5011 - 443 = \frac{5137}{2} + 1435 = 4724'$

Ave. Column Temp. $\frac{70}{2} + 153 + 112 + 460 = 572.0°R$

Wellhead S.I.C.P. = 1095 - 64#.

Est. Abs'l Pay 130 ft, Porosity .085, Wat. Sat. 0.315

Bottom Hole Calculations.

$$K_{s1} = \frac{GL}{(53.34)(T_{si})} = \frac{.665 \times 4724}{(53.34)(572)} = \frac{3141}{30617} = .1025$$

Est. P. Est. for determining F_{pv}

$$B.H.P. = \frac{P_{si} + (14.268)(P_s)(GL)}{(759931)(T_{s1})} = \frac{(24.268)(1095)(3141)}{(759931)(572)} = 112.9 + 1095 = 1207.9$$

(15,625,480 / 20.559 / 5,491)

$$P_{AV} = \frac{1095 + 1207}{2} = 1151.5$$

$$F_{pv} = (1.084)^2 = 1.1750$$

$S = 1.1750$

Computing B.H.P computation.

$$KS = (K_{s1})(S) = (.1025)(1.1750) = .1204$$

$$e^{KS} = (2.718)^{KS} = (2.718)^{.1204} = Log\ e^{KS} = (.434249)(.1204)$$

$$= .052285$$

$$Anti\ Log = 1.12793$$

$$B.H.P = 1095 \times 1.12791 = 1235.0$$

Going Cal. B.H.P. for new assumed B.H.P.

$$\frac{1095 + 1235}{2} = 1165.0$$

$F_{pv} = (1.084)^2 = 1.1750$

S = same as previous calculations Assume 1235 lbs. corrct. B.H.P.

(5270)

Void Space. in Aquifer

$13,560 \times .088 \times (100 - .315) = 2625.8$

Pressure Reduction (1218 psia, 665 R, 153°F.)

$F_{pv} = (1.080)^2 = 1.1236$

Reservoir Pressure = $\frac{1235}{1.5027} = 81.06 + 2.19$

Depletion = $\frac{520}{613124} = .848$

Recovery = $\frac{1235 - 111}{1235} = .910$

(actual

Est. Pressure at 100 Psia wellhead pressure, P_{si}

γ_g = .1025 (assumed initial)

Est. BHP = $P_{si} + \frac{(14.268)(P_{si})(\gamma_g)}{(759.93)(T_{si})} = \frac{(14.268)(100)(.3144)}{(759.93)(537)} = 10.3$

BHP = 100 + 10.3 = 110.3

$\frac{100 + 110}{2} = 105$

$F_{pv} = (1.007)^2 = 1.014$

$S = 1.014$

$KS = (.1025)(1.014) = .1039$

$e^{KS} = (2.7183)^{KS} = (2.7183)^{.1039}$ Log $e^{KS} = (.43429)(.1039)$

" " = .0440898

$e^{11} =$ Anti log .0440898

11 = 1.1068

BHP = 100 × 1.1068 = 110.6

Recoverable Reserve cu. ft. Ac. ft. 187,067 (316,000)

(2625)(1.1236)(82.19)(.848)(.910) = ~~184,089~~

187.067 × 130 = 24,318.7 MCF/Ac.

24,318 × 325.48 = 7,915,022 MCF + 320

Col. Temp. 153 + 460 = 613° R.
Gas Gravity .6765 + .6 + .6 + .6 + .6 + .6 + .6 + .6 = .6765
Column Length: 3142' + 4432' + 3622' + 5181' = 16377' Mid Point

Ave. Column Temp. = 112° + 460 = 572° R
Wellhead S.I.P. = Ave of 7 Wells = 1062 psia.

Mid Point = Ave of 7 Wells = 1185
Porosity = .058
Interstitial H_2O = .315

Bottom Hole Calculations

$$\pi_{si} = \frac{G_g}{(53.34)(T_{si})} = \frac{(.6765)(4807)}{(53.34)(572)} = \frac{3240}{30617} = .1058$$

Est. B.H.P. $P_{si} + \frac{(.0187)(.6765)(1062)(3240)}{(759931)(572)} = 1125$

B.H.P. = 1062 + 112 = 1174

$P_{AV} = \frac{1062 + 1174}{2} = 1118$

$F_{pv} = (1.089)^2 = 1.1859$

$S = 1.1859$

$KS = (K_{si})(S) = (.1058)(1.1859) = .125466$

$e^{KS} = (2.718)^{KS} = (2.718)^{.125466}$ Tay $e^{KS} = (1.343249)(.12546)$

" " = .0532388

$e^{KS} = 1.1304$

B.H.P. = 1062 X 1.1304 = 1200.5

Est. again.

$P_{AV} = \frac{1062 + 1200}{2} = 1131$

$F_{pv} = 1.089$

F_{pv} is the same as previous Cal. 1200 is correct.

Void Space

43,560 x .0281 (1.00 - .315) = 2625.8

Reservoir Temp

$F_{pv} = (1.064)^2 = 1.1320$

Reservoir Bbls. $\frac{1700}{15,025} = .1131$

Pump Bbls = $\frac{520}{613} = .848$

Running Factor = $\frac{1200 - 1131}{1200} = .057$

Est. Horsepower required B.H.P.

K_{SI} = .1058 Isometric compressibility factor

$$S.H.P. = P_{SI} + \frac{4{,}112.67 \times 10.2 \times 566.4 \times .0187}{.529 \times 572} = 16.6$$

B.H.P. = 100 + 11 = 111.

Recovery cu. ft. Ac. ft.

2625 X 79.86 X .845 X .987 X 1.1320 = 182,519.

MCF/Ac.

182,519 X 118 = 21,537

21,537 X 320 = 6,891,840. MCF/320

P_c psig	P_c^2 (lbs/in²)²	P_1 psig	+	$P_1^2 - P_2^2$ lbs/in²	$P_1^2 - P_2^2$ lbs/in² psia	Q 2 sec psig 1 cycle	Q Sample Summer #1
1012	1199.0	500	512	262.1	936.8		4570
1050	1127.8				866.7	910	4310
1000	1021.1				762.0	845	3920
900	925.4				663.3	770	3500
900	831.7				569.6	660	2960
850	743.0				480.9	552	2600
800	659.8				397.2	505	2370
750	580.6				318.5	425	2030
700	506.9				244.8	350	1660
650	438.2				176.1	270	1300
600	374.5				112.4	195	910
550	315.8				53.7	112	525
525	537				26.2	63	310
500	512				0		
			300 Line			300 psig	300 psig
1083	1095			97.3	1101.6		5200
1050	1062				1030.5	1030	4900
1000	1012				926.8	960	4600
950	962				828.1	850	4180
900	912				734.4	800	3800
850	862				645.7	710	3430
800	812				562.0	653	3100
750	762				483.3	553	2670 2575
700	712				409.6	515	2450
650	662				340.9	450	2120
600	612				277.2	366	1820
550	562				218.5	340	1460
500	512				164.8	260	1240
450	462				116.1	200	940
400	412				72.4	140	630
350	362				33.7	81	388
325	337				12.1	37	117
300	312				0		
		Q(21) = 12.5	100 psig	Line.			
1083	1095				1186.4		5410
1050	1062				1115.3	1100	5150
1000	1012				1011.6	1020	4820
950	962				912.9	990	4480
900	912				819.2	862	4100
850	862				730.5	800	3800
800	812				646.8	730	3470
750	762				568.1	660	3050
700	712				494.4	590	2800
650	662				425.7	530	2500
600	612				362.0	470	2230
550	562				303.3	412	1960
500	512				249.6	355	1700

| | | |

Previous Report dated 11-4-53

SICP (18-4-53) 1067 psia
K_s .1625
Column Temp. 112 + 460 = 572
Res. Temp. 153 + 460 = 613
Column to Midway 1124

π_{si} = .1025

Est. BHP $\frac{.0187 \times 68 \times .3141 \times 1067}{.759937 \times 572} = 109$ (5859.17)

BHP = 1067 + 109 = 1176

$P_{av} = \frac{1067 + 1176}{2} = 1122$

$F_{pv} = (1.081)^2 = 1.1685$

S = 1.1685

$KS = (\pi_{si})(S) = (.1025)(1.1685) = .1197$

$e^{KS} = (2.718)^{.1197} = (.484249)(.1197)$

.0579
1.1271

BHP = 1067 × 1.1279 = 1202.6

$P_{av} = \frac{1067 + 1205}{2} = 1136$

F_{pv} = 1.089 Chart 1203 Curve 1

Initial Bottom Hole 1235 psia
Aug. 4, 1953 B.H. 1203 "
32 # Drop.

Production Aug to Dec. 1953 818,106
" Dec. to July 1st 1954 1,088,916
1,907,322 MCF

Reduction
Chart. $\frac{1,907,322 \text{ MCF}}{32\#} = 59,604$ MCF Per # Drop.
845 W.H.

To Prod. OCC. Record for 320 in $\frac{7,915,022}{1124}$ = 1235 Res. Initial
1,907 MCF 1124 " Chart.
Has Produced 1,700 41 MCF per # Drop.
24 Yrs. Should have produced 1,041 × 32 = 225.3 MCF Limited
Record of 1,907. MCF for 32 # Drop. a difference of
(Reason 1,907. − 225. = 1,682. MCF Unaccounted for gas.
Drop 1160-40
Gas)

At 59.6 MCF per # Drop the Record for the 32 Yrs
Accounts could be 66,990. MCF or Gas Could be Over
7,915. MCF. (206 MCF/Ac.)
At 59.861 MCF per # Drop and 1320 Ac. Well Drained
Sand Size: $\frac{66,990.}{59.861 \text{ per ft } 1320} = 1119$ ft of net Pay.

Ratio & Reserves.

Lit Pay Ratio 1:4.3 on 54 mile
Largest Variation in Core Data available
is Dr. 7.0 to 14.1 ft $\frac{5.1}{14.1}$ = 35%

However the Max. Ratio of 1:4 will
be 1:2

The Max Ratio would cause reduction
by any available core analyses to
1:1.2 & 7 to 14.1 ft

therefore assuming the Max. could
having the Max. and Pay Sand
be the Max. and space Net Reserve Ratio
could be high as 1:4

Void space due to Dolomitization
Summed Di
43,560 X .016 X (100 - 31.5) = 2646 cu ft ac. ft.
Net Pay 130 ft. X 2646 = 341,380 @ 8.8 ± 315
Lenwyth Dolomitization occurred to cause
Dual porosity with void space
in the 130 ft Pay with vertical hairline
192 fractures 1/16 inch wide over the 130 ft
or one fracture every .67 ft. Therefore the
said Pay would increase to 341,380
+ 43,560
384,940

The % Compressibility would be
341,380 X 1.1236 X .845 X .91 = + 295,838
384,940 X 1.1236 X 7.45 .91 = 330,617
+ 9,779

11.7 % Increase in Reserves
2,915 MCF/A X 111.7 % = 27,159
7,915 MCF/325.4 Ac X 111.7 = 2,341 MCF

3 11 9W

7 8 5

34 35 36

SW. Hackberry
I.P. 2240
Del. — N.T.
SICP —
Prod. 266
N.P. 130

A

Delhi-Hackberry
I.P. 5782
Del. 1753
SICP 1046
Prod. 1977
N.P. 110
(1030) 7da.

Delhi-Pritchard
I.P.
Del. 2137
SICP 1018
Prod. 1166
N.P. 120
(1010) 7da.

Delhi-Hackberry 1-19
I.P. 5690
Del. 1160
SICP 1036
Prod. 462
N.P. 105
(1038)

B

Turner-State #1
I.P. 20,300
Del. 15,675
SICP 1095
Prod. 4206
N.P. Est. 135

R-C-Sais #2
I.P. 6980
Del. 1283
SICP 1106
Prod. 769
N.P. 115
(976) 7da.

Delhi-Pritchard #1
I.P. 3737
Del. —
SICP 1090
Prod. 481
N.P. 115
N.T.

C

Edge-Castle #2
I.P. 3250
Del. 1143
SICP 1079
Prod. 505
N.P. 110

(996)

Edge-Sais #2
I.P. 7812
Del. 1075
SICP 1064
Prod. 575
N.P. 125
(1008) 7da.

Edge-Sais #3

Delhi-Hackberry 1-19
I.P. 5115
Del. 924
SICP 1050
Prod. 443
N.P. Est. 130
(989)

A

Edge-Hackberry
I.P. 6840
Del. 1145
SICP 1080
Prod. 725
N.P. 125
(972-7da)

NP 105

10 11 12

3 0 11 9W

1067
993
71
(998)

Blue Creek on Myk Commission
Kenyon.

E.P. Nat. da/Acs. 168,309
S.U. " " " 19,271
187,580
328 = 571.8 /da/well/yr

E. Riverside 274
S.U. " 54
328

Must go 1-4 in Reservoir
Thru largest Pool would be.

571 x 4 = 2284 MCF/da.

2284
Largest Group. 15,675 Del.

14.5 % Del. L.F.

1-2 Ratio. 571/2
1142
15,675 = 7.3 %

1-5 Ratio. 571/5
2855
15,675 = 18.2

5-10 M Groups.

1-4 2284 Cubic = 26.7 % L.F.
8536 Del.

3-5 Groups.

2284 Ft. = 61.6 %
3704

5.
x 1.6

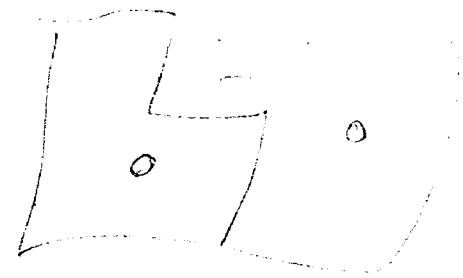
Cimarron Bald PL's. Taken: Acreage/well L.F.
would be.

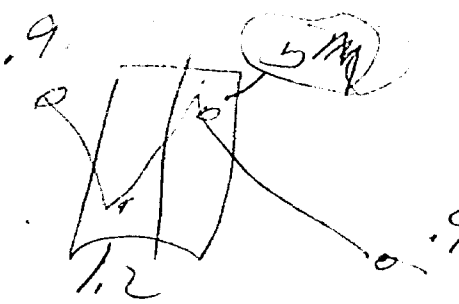
294,501
4 c. 559
311,060 = 1039.8 571/1040 = 54.9
328

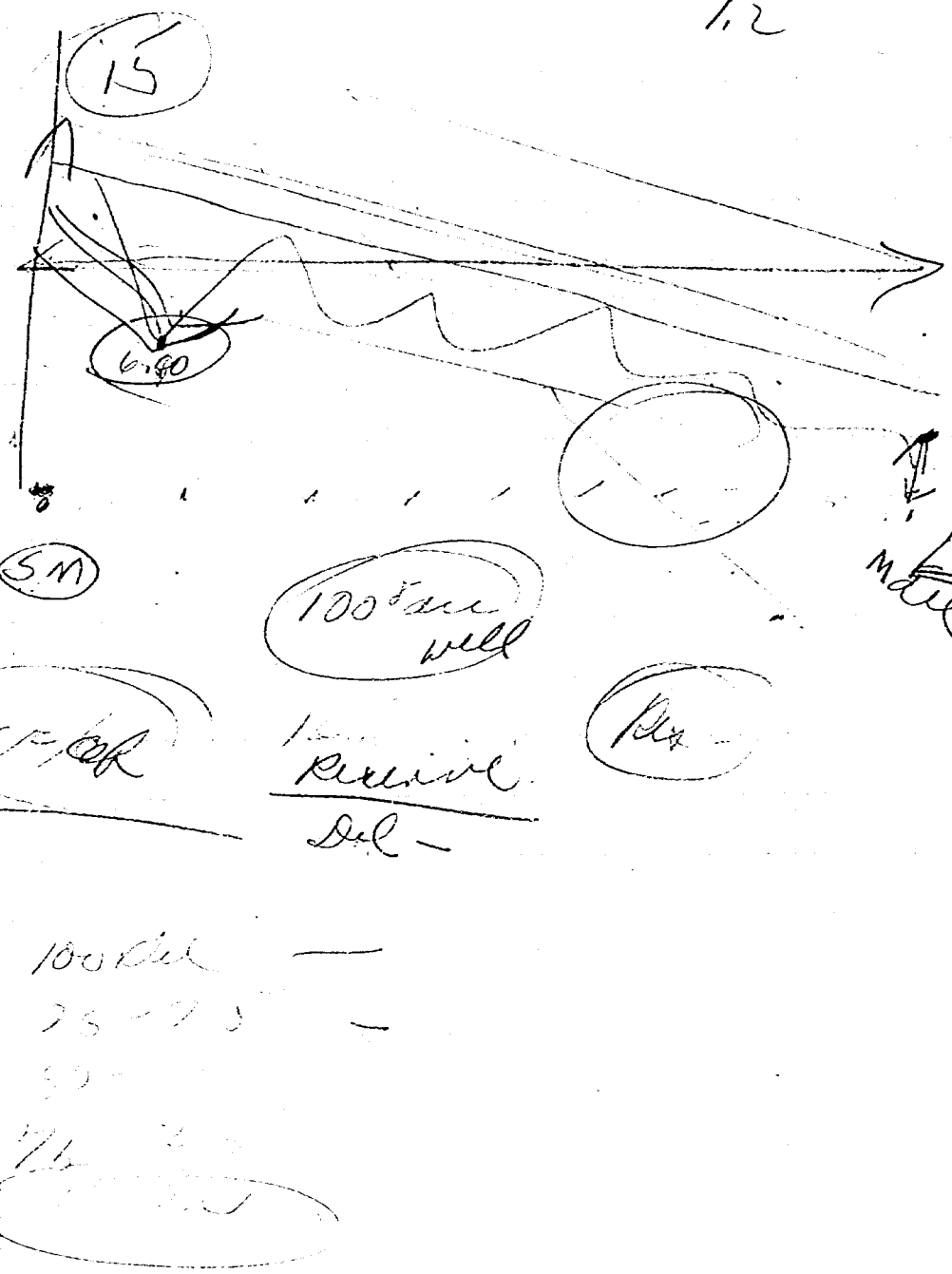
[illegible] 57/ [illegible] 298,216 per day.

E.P. Div No. 154,498
S.V. " " 25,571
183,069

~~107~~
315
422





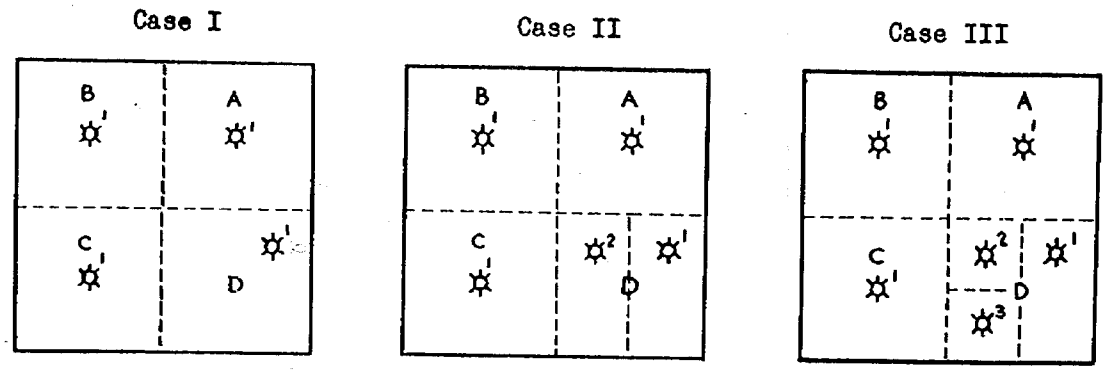


Days to Produce Revenue.

Example Showing the Necessity of Including Acreage In Each Term of a "Plus-Type" Allocation Formula in Order To Comply with the Provisions of Section 13(c) of Senate Bill No. 163; Approved March 17, 1949, by the Legislature of the State of New Mexico

Section 13(c) The pooling of properties or parts thereof shall be permitted, and, if not agreed upon, may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of a uniform spacing plan or proration unit, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum or natural gas, or both, in the pool; provided, that the owner of any tract that is smaller than the drilling unit established for the field, shall not be deprived of the right to drill on and produce from such tract, if same can be done without waste; but in such case, the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in ratio of the area of such tract to the area of a full unit. All orders requiring such pooling shall be upon terms and conditions that are just and reasonable, and will afford to the owner of each tract in the pool the opportunity to recover or receive his just and equitable share of the oil or gas, or both, in the pool as above provided, so far as may be practicably recovered without waste. In the event such pooling is required the costs of development and operation of the pooled unit shall be limited to the lowest actual expenditures required for such purpose including a reasonable charge for supervision; and in case of any dispute as to such costs, the Commission shall determine the proper costs.

Effect of Acreage in a "Plus-Type" Allocation Formula



Allocation Formula "A" : 50% Acreage / 50 % Deliverability

Well	Acreage	Deliverability Mcfd	Allowable - Mcfd Acreage	Deliverability	Total
Case I-A					
A-1	160	1000	500	200	700
B-1	160	2000	500	400	900
C-1	160	3000	500	600	1100
D-1	160	4000	500	800	1300
	640	10000	2000	2000	4000
Case II-A					
A-1	160	1000	500	143	643
B-1	160	2000	500	286	786
C-1	160	3000	500	429	929
D-1	80	4000	250	571	821
D-2	80	4000	250	571	821
	640	14000	2000	2000	4000
Case III-A					
A-1	160	1000	500	111	611
B-1	160	2000	500	223	723
C-1	160	3000	500	334	834
D-1	80	4000	250	444	694
D-2	40	4000	125	444	569
D-3	40	4000	125	444	569
	640	18000	2000	2000	4000

Allocation Formula B : 50% Acreage + 50% (Acres x Deliverability)

Well	Acreage	Deliverability Mcfd	(Ac. x Deliv.)	Allowable - Mcfd Acreage	(Ac. x Deliv.)	Total
			Case I-B			
A-1	160	1000	160,000	500	200	700
B-1	160	2000	320,000	500	400	900
C-1	160	3000	480,000	500	600	1100
D-1	160	4000	640,000	500	800	1300
	640	10000	1,600,000	2000	2000	4000
			Case II-B			
A-1	160	1000	160,000	500	200	700
B-1	160	2000	320,000	500	400	900
C-1	160	3000	480,000	500	600	1100
D-1	80	4000	320,000	250	400	650
D-2	80	4000	320,000	250	400	650
	640	14000	1,600,000	2000	2000	4000
			Case III-B			
A-1	160	1000	160,000	500	200	700
B-1	160	2000	320,000	500	400	900
C-1	160	3000	480,000	500	600	1100
D-1	80	4000	320,000	250	400	650
D-2	40	4000	160,000	125	200	325
D-3	40	4000	160,000	125	200	325
	640	18000	1,600,000	2000	2000	4000

Ratio of Acreage vs. Allowable

Well	Acreage	(Acreage / 160)	50% Ac + 50% Deliv. Allowable	(Allowable / 160 Ac. Allowable)	50% Ac. + 50% (Ac. x Deliv.) Allowable	(Allowable / 160 Ac. Allowable)
			Case II-A and Case II-B			
D-1	80	0.500	821	.632	650	0.500
D-2	80	0.500	821	.632	650	0.500
			Case III-A and Case III-B			
D-1	80	0.500	694	.534	650	0.500
D-2	40	0.250	569	.438	325	0.250
D-3	40	0.250	569	.438	325	0.250

Based on the necessary assumption that all wells drilled in the SE/4 will have equal deliverabilities, it is obvious that under Formula "A" the allowable production from the tracts smaller than 160 acres as compared with the allowable production if such tract contained 160 acres is not "in ratio of the area of such tract to the area of a full unit", while under Formula "B" it is apparent that the required ratio is maintained.

It is equally obvious that under Formula "A", the operator having larger acreage units will of necessity have to drill unnecessary wells in order to prevent wells located on smaller acreage from obtaining more than their share of the market. Under Formula "B" the allowables of the offset wells are not affected by the number of wells producing on the SE/4 and there is no necessity to wastefully drill unnecessary wells.

1. EPNG #1 State
   SW/2-30N-9W
   IP 20,300, D, 15,909

2. Stanolind #1 Shaw Gas Unit
   NE/14-30N-9W
   IP 17,725, D, 9,723

3. Delhi #1 Riddle
   NE-21-30N-9W
   D, 17,839

4. Anderson-Prichard #4 Johnston
   NE/33-31N-9W
   IP 11,750, D, 2,618

5. Pubco #6 State
   SW/36-31N-9W
   IP 23,000, D,9,015

6. Woodriver #3 Lambe]
   SW/21-31N-10W
   IP 26,860, D,4749

7. Critchell Parsons-Standard of Texas #1 State
   NE/2-31N-11W
   IP 11,900

8. Pubco #2 Hamilton
   NE/30-32N-10W
   IP 5,600, No. D.

9. Pubco #8 State
   SW/36-32N-12W
   IP 9,360, No. D.

10. Southern Union #1 Hillstrom
    SW/35-32N-12W
    IP 4,023

11. EPNG #3-D Riddle
    SW/22-31N-9W
    IP 36,285, No. D.

12. EPNG #3-D Howell
    NE-31-31N-8W
    IP 11,000, D.5,803

Reservoir Data

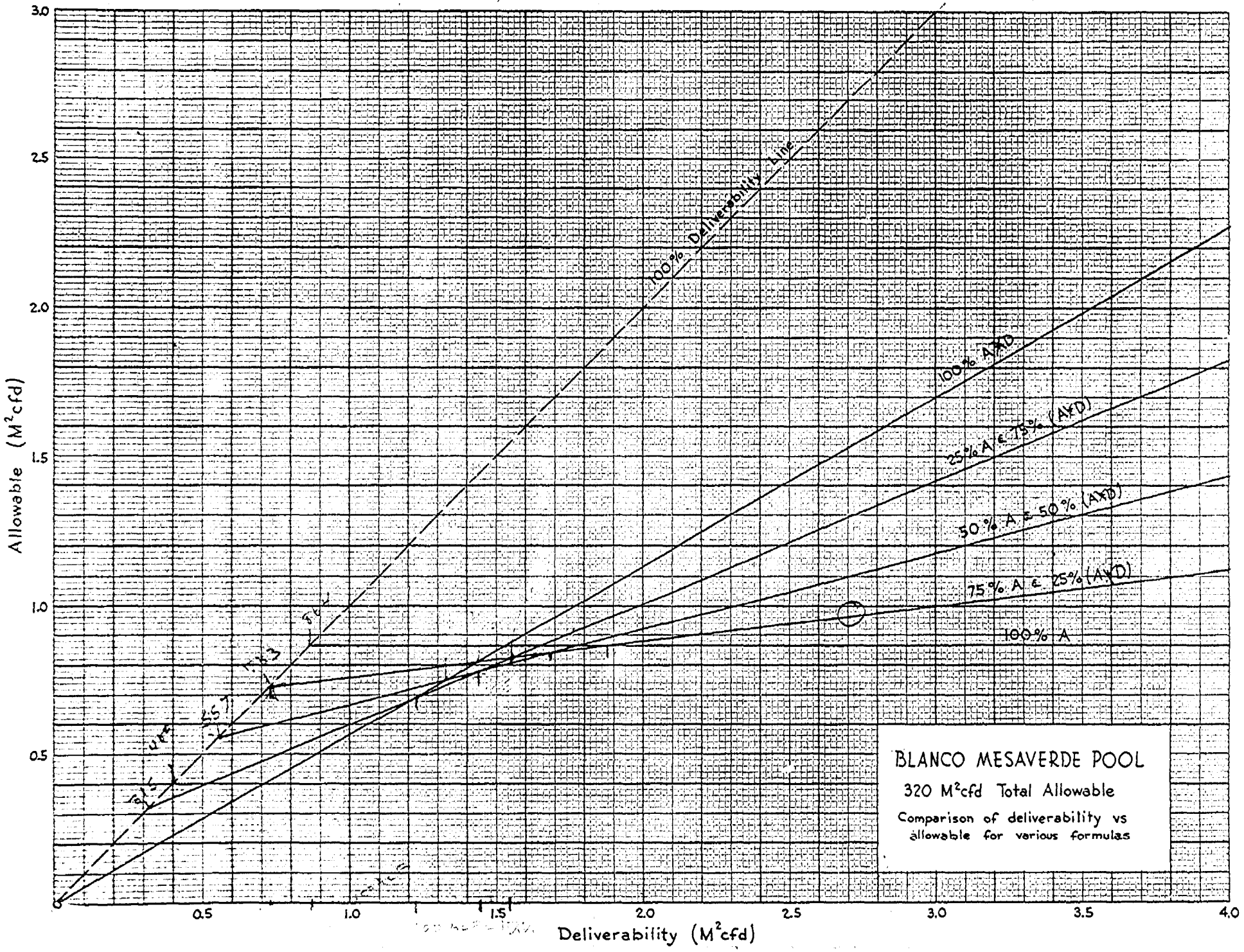
	Well	Location		Cliff House	Point Lookout
			Gross Pay	131	100
Average) Closest) Logs)	El Paso #1 State	SW/2-30N-9W IP 20,300 MCF	Net Pay	60	55
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	100	115
Actual) Log)	Stanolind #1 Shaw Gas Unit	NE/14-30N-9W IP 17,726	Net Pay	70	60
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	140	120
Closest) Log)	Delhi #1 Riddle	NE/21-30N-9W IP 17,839	Net Pay	70	60
			Potosity		
			Permeability		
			Connate Water		
			Gross Pay	135	125
Actual) Log)	Anderson-Prichard #4 Johnston	NE/33-31N-9W IP 11,750	Net Pay	70	45
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	115	110
Closest) Logs)	Pubco #6 State	SW/26-31N-9W IP 23,000	Net Pay	65	50
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	110	110
Actual) Log)	Wood River #1 Lambe	SW/21-31N-10W IP 26,860	Net Pay	70	50
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	110	110
	Critchell Parsons & Standard of Texas #1 State	NE/2-31N-11W IP 11,900	Net Pay	50	65
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	100	100
	Pubco #2 Hamilton	NE/30-32N-10W IP 5,600	Net Pay	65	50
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay	150	120
	Pubco #8 State	SW/36-32N-11W IP 9,360	Net Pay	80	60
			Porosity		
			Permeability		
			Connate Water		
			Gross Pay		
	Southern Union #1 Hillstrom	SW/35-32N-12W IP 4,023	Net Pay		
			Porosity		
			Permeability		
			Connate Water		

Well	Location		Cliff House	Point Lookout
El Paso #3-D Riddle	SW/22-31N-9W IP 36,285	Gross Pay	110	130
		Net Pay	60	75
		Porosity		
		Permeability		
		Connate Water		
El Paso #3-D Howell	NE/31-31N-8W IP 11,000	Gross Pay		
		Net Pay		
		Porosity		
		Permeability		
		Connate Water		

Well		Porosity	Water
El Paso #1 Neil Sec. 14-31N-11W	Cliff House Point Lookout 60'	7.1	31.8
El Paso #2 Mansfield Sec. 19-30N-9W	Cliff House 83' Point Lookout, 60'	11.1 10.1	42.2 20.6
El Paso #1 Jaquez P.U. Sec. 29-31N-9W	Cliff House, 48' Point Lookout, 78'	7.5 6.6	28.1 35.0
El Paso #1-A Warren Sec. 25-28N-9W	Cliff House, 32' Point Lookout	13.5	53.5
El Paso #1 Lawson Sec. 11-31N-11W	Cliff House, 12' Point Lookout, 28'	12.8 14.1	20.5 19.1

KEUFFEL & ESSER CO. N.Y.

Ex #7



BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

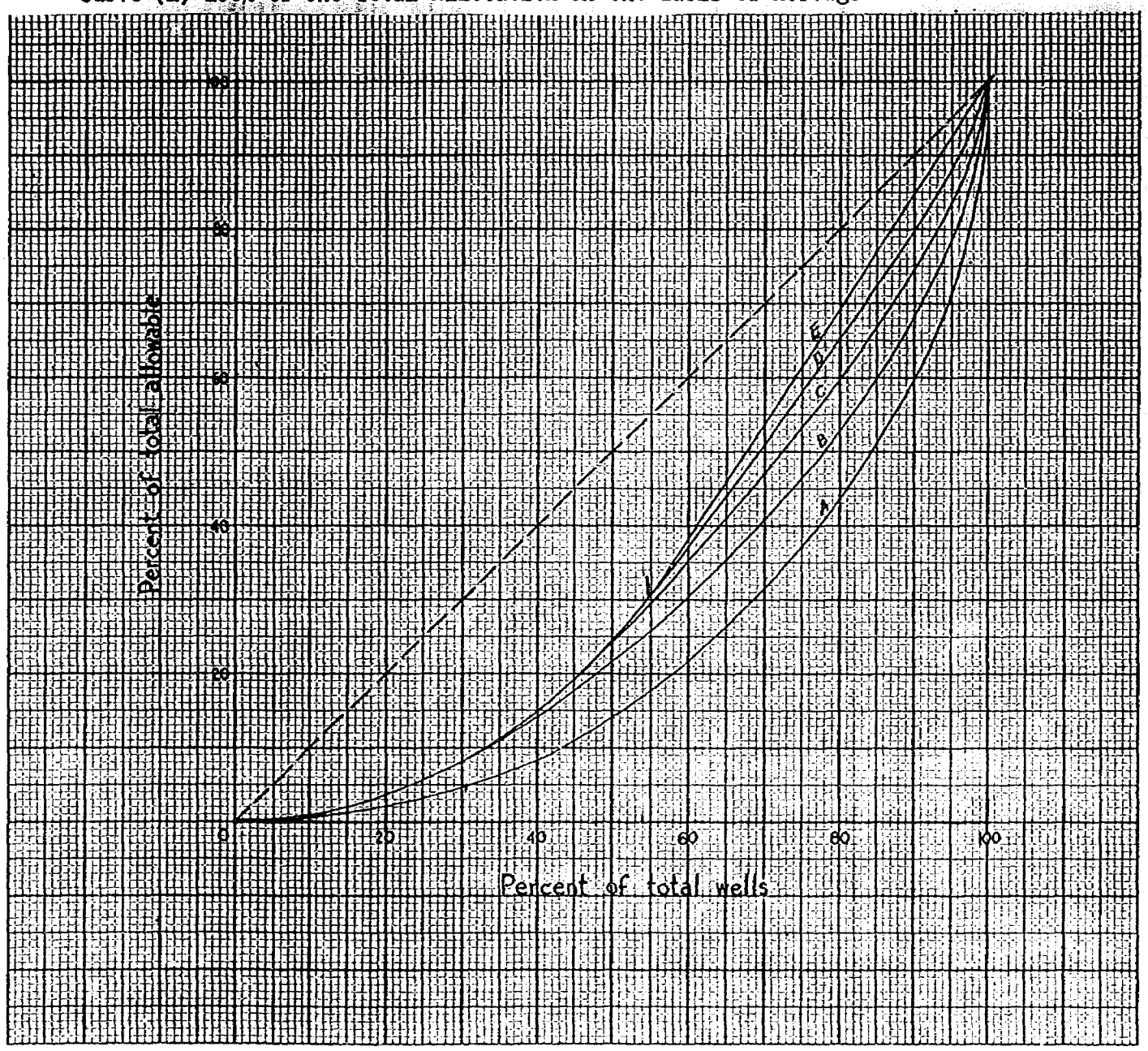
Curve (A) 100% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (B) 25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (C) 50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (D) 75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (E) 100% of the Total Allocation on the Basis of Acreage



BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M²cfd

100% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Deliverability Mcfd	Cumulative Deliverability Mcfd	Percent of Allowable
29	29	5.07	941	941	0.17
29	58	10.14	2 291	3 232	0.58
29	87	15.21	3 814	7 046	1.25
29	116	20.28	5 041	12 087	2.15
29	145	25.35	6 534	18 621	3.31
29	174	30.42	8 110	26 731	4.76
29	203	35.49	9 987	36 718	6.53
29	232	40.56	12 480	49 198	8.75
29	261	45.63	14 456	63 654	11.32
29	290	50.70	17 266	80 920	14.40
29	319	55.77	20 992	101 912	18.13
29	348	60.84	24 560	126 472	22.50
29	377	65.91	27 065	153 537	27.32
29	406	70.98	29 300	182 837	32.53
29	435	76.05	32 384	215 221	38.29
29	464	81.12	38 193	253 414	45.09
29	493	86.19	45 175	298 589	53.12
29	522	91.26	54 253	352 842	62.78
29	551	96.33	70 901	423 743	75.39
21	572	100.00	138 325	562 068	100.00
572			562 068		

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M2cfd

25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 452	36 183	11.31
29	232	40.56	10 508	46 691	14.59
29	261	45.63	11 320	58 011	18.13
29	290	50.70	12 469	70 480	22.03
29	319	55.77	13 996	84 476	26.40
29	348	60.84	15 455	99 931	31.23
29	377	65.91	16 479	116 410	36.38
29	406	70.98	17 395	133 805	41.81
29	435	76.05	18 658	152 463	47.65
29	464	81.12	21 034	173 497	54.22
29	493	86.19	23 898	197 395	61.69
29	522	91.26	27 617	225 012	70.32
29	551	96.33	34 430	259 442	81.08
21	572	100.00	60 553	319 995	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	16 401	80 055	25.02
29	319	55.77	17 396	97 451	30.45
29	348	60.84	18 309	115 760	36.17
29	377	65.91	18 944	134 704	42.09
29	406	70.98	19 517	154 221	48.19
29	435	76.05	20 309	174 530	54.54
29	464	81.12	21 794	196 324	61.35
29	493	86.19	23 575	219 899	68.72
29	522	91.26	25 894	245 793	76.81
29	551	96.33	30 151	275 944	86.23
21	572	100.00	44 063	320 007	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	17 266	80 920	25.29
29	319	55.77	20 759	101 679	31.77
29	348	60.84	21 641	123 320	38.54
29	377	65.91	21 945	145 265	45.39
29	406	70.98	22 213	167 478	52.33
29	435	76.05	22 583	190 061	59.39
29	464	81.12	23 281	213 342	66.67
29	493	86.19	24 116	237 458	74.20
29	522	91.26	25 209	262 667	82.08
29	551	96.33	27 207	289 874	90.58
21	572	100.00	30 141	320 015	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

100% of the Total Allocation on the Basis of Acreage

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.36
29	203	35.49	9 987	36 718	11.48
29	232	40.56	12 480	49 198	15.38
29	261	45.63	14 456	63 654	19.90
29	290	50.70	17 266	80 920	25.30
29	319	55.77	20 992	101 912	31.86
29	348	60.84	24 451	126 363	39.50
29	377	65.91	25 056	151 419	47.33
29	406	70.98	25 056	176 475	55.17
29	435	76.05	25 056	201 531	63.00
29	464	81.12	25 056	226 587	70.83
29	493	86.19	25 056	251 643	78.66
29	522	91.26	25 056	276 699	86.50
29	551	96.33	25 056	301 755	94.33
21	572	100.00	18 144	319 899	100.00
572					

MHC:lp
6-16-54

-21 6

BLANCO MESAVERDE - POOL

Comparison of Various Formulas

Description	Formula 0% A & 100% (AxD)	25% A & 75% (AxD)	50% A & 50% (AxD)	75% A & 25% (AxD)	100% A & 0% (AxD)
Acreage Factor (1)		186.1407	414.8525	644.6538	864.4391
Deliverability Factor (1)	0.5693261	0.4095009	0.2555516	0.1200091	
Limiting Deliverability Mcfd	-	315	557	733	864
Number of Wells					
Limited Wells (2)	-	181	267	312	342
Non-limited Wells (3)	572	391	305	260	230
Total	572	572	572	572	572
Percent of Total Wells					
Limited Wells	-	31.64	46.68	54.55	59.79
Non-limited Wells	100.00	68.36	53.32	45.45	40.21
Total	100.00	100.00	100.00	100.00	100.00
Allowable - Mcfd					
Limited Wells		28 876	66 939	96 520	121 179
Non-limited Wells	320 000	291 124	253 061	223 480	198 821
Total	320 000	320 000	320 000	320 000	320 000
Percent of Total Allowable					
Limited Wells		9.02	20.92	30.16	37.87
Non-limited Wells	100.00	90.98	79.08	69.84	62.13
Total	100.00	100.00	100.00	100.00	100.00

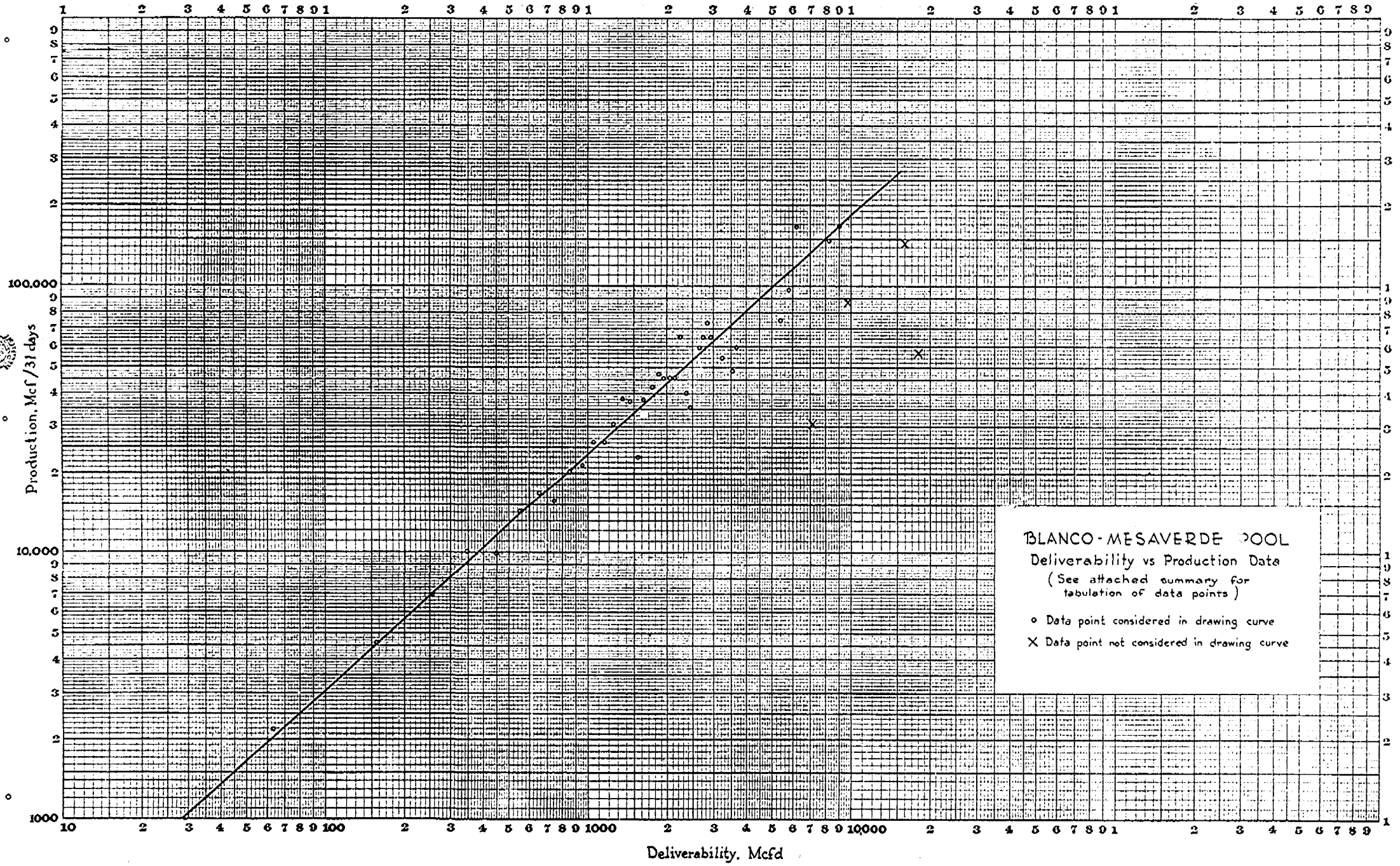
(1) Factors based on 320 acres per well.

(2) A limited well is one for which the allowable is equal to the deliverability.

(3) A non-limited well is one for which the allowable is less than the deliverability.

MHC:lp
6-18-54

Exh 1



CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

NO. 4223. LOGARITHMIC 5 BY 3 INCH CYCLES.

PROPOSED RULES
BLANCO MESAVERDE POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

Section 1. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless,

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the pool;

(b) Such drilling unit be in the shape of a rectangle except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit;

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions. Further tolerance shall be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

Section 2. The special rules and regulations for the Blanco Mesaverde Pool contained herein shall be limited in their application to the present 4200-5100 foot productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde.

Section 3. Proration Units: The proration unit shall consist of 320 acres or (a) a legal United States General Land Office Survey half-section and (b) the approximate 320 acre unit shall follow the usual legal subdivision of the General Land Office Section Surveys and (c) where proration units lie along the edge of field boundaries described in Section 1 above, exceptions shall be permissible in that contiguous tracts of approximately 320 acres, following regular United States General Land Office subdivisions may be classed as proration units.

(a) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract that is smaller than the drilling unit establishment for the field, shall not be deprived of the right to drill on and produce from such tract if same can be done without waste; but in such case the allowable production from such tract, as compared with the allowable production therefrom if such tract were a full unit, shall be in the ratio of such tract to the area of a full unit of 320 acres.

Section 4. Allocation:

(a) The reasonable lawful required production from the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, shall be determined by nominations for the production from gas wells produced therein submitted to the Commission in a required affidavit form, but the Commission in considering such nominations shall not necessarily be bound thereby; however, the Commission will adjust the allowed production as determined by this method to the actual production from the pool as determined from its records.

(b) The daily allowable production of gas from individual wells completed in the Blanco Mesaverde Pool of San Juan and Rio Arriba Counties, New Mexico, shall be determined by allocating the allowable production among the individual wells completed in the Mesaverde horizon in the proportion that the product that the datum reservoir pressure and the acreage containing such well bears to the summation of this product with respect to each well producing from said pool.

(c) Datum reservoir pressure for each well shall be determined either by the bomb method or by an approved calculation method.

(d) Datum reservoir pressure is defined as the pressure in pounds (p.s.i.) determined either by the bomb method or by an approved calculation method at a datum of _____.

(e) Reservoir pressure whether determined either by the bomb method or by an approved calculation method shall be made after a shut in period of not more than 8 nor less than 7 continuous days.

(f) Prior to the shutting in of any well, in order to determine the reservoir pressure as set out herein, any such well shall have been produced at a stabilized rate of flow for a 72 hour period and shall have produced as a minimum that volume of gas assigned to the well as its daily average allowable on the Commission's schedule for the current period, or that volume of gas which would be assigned to such well in accordance with the allocation formula as provided herein.

(g) Reservoir pressure determination on all such wells, as required by the provisions of this order, shall be submitted to the Commission on forms provided by the Commission, which forms must be submitted to the Commission by the _____ day of _____, 1954, and semi-annual reservoir pressure determinations are to be submitted on all wells in such pool thereafter with the filing of such information as required by the Commission on such forms.

Section 5. Underproduction and Overproduction:

(a) For the purpose of computing and balancing overproduction and underproduction in the Blanco Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico, the dates 7 o'clock a.m., March 1, and 7 o'clock a.m., September 1, are to be known as balancing dates; and the six months period beginning 7 o'clock a.m., March 1, and ending 7 o'clock a.m., September 1, and beginning 7 o'clock a.m., September 1, and ending 7 o'clock a.m., March 1, will be considered as separate entities and will be known as balancing periods.

(b) Underproduction:

1. In the event there shall not be produced from any gas well in the Blanco Mesaverde Pool during a balancing period as much gas as is allocated thereto, under orders of the Commission the operator of any such well shall be permitted to carry such underproduction forward to the next succeeding balancing period as future allowable credit to be produced during that period.

2. The amount of underproduction to be carried forward into any new balancing period as allowed production during such new balancing period, shall consist of the actual underproduction that accrued in the balancing period immediately preceding such new balancing period, and the accumulated well status as to underproduction will be adjusted on each balancing date accordingly.

3. With respect to a producing well that has been accumulatively underproduced on each of two succeeding balancing dates, such well shall not be credited with any underproduction except that this shall not apply to wells shut in for lack of pipe line connection, and such well shall not be assigned a monthly allowable greater than the maximum monthly production had from such well during the immediate preceding balancing period; provided, however, that such limited allowable as is assigned to such well hereunder may be adjusted to a value not to exceed the allowable accruing to such well under the allocation formula, upon certification to the Commission from the operator thereof that such well is producing gas in excess of the limited allowable assigned it.

(c) Overproduction:

1. Each operator of each gas well in the Blanco Mesaverde Pool may produce such well in excess of the allowable for the proration period; provided, that no well shall, during the proration period, produce at a rate in excess of twice the daily average rate required to produce the normal current allowable for the current proration period.

2. Any well overproduced as of a balancing date, and which well was also overproduced on the balancing date immediately preceding and remained overproduced for the entire period between the two balancing dates, shall be shut in until the overproduction, existent as of the later of such two balancing dates, is made up; this unless exception is had as provided for in the next succeeding paragraph hereof.

3. The operator of a well which, under the provisions of the immediately preceding paragraph, would be required to be shut in may, if such operator is of the opinion that complete well shut in will materially damage his well, request a hearing before the Commission, which hearing will be held only after due notice is given to all operators in the pool.

4. Except where shut in is required in making up overproduction, as outlined in paragraphs 2 and 3 above, overproduction existent as of any balancing date shall be made up during the balancing period immediately following, and may be made up at any time during such period.

Section 6. Casing and Cementing Program:

(a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cemented shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before drilling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remian dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job shall be tested by building up a pressure of 1,000 psi. closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set on top of the Cliff House Sand with a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 Psi, closing the valves, and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

(d) Rules and Regulations of the Commission relating to drilling, abandonment, production shall be applicable.

Section 7. Tubing:

(a) Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perofrations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

Section 8. Special Equipment:

(a) Any well which produces oil shall be equipped with a meter setting of adequate size to measure efficiently the gas, with this meter setting to be installed on the gas vent or discharge line. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static, bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 psi working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 psi shall be installed on all production string and bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

Section 9. Safety Requirements:

(a) Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

Section 10. Shooting of Wells:

(a) Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned. (See Rule 42, Order Number 4, Effective 8-12-35).

Section 11. Initial Potential Test:

(a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eight (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

Section 12. Protection of Mineral Deposits:

(a) Since the Menefee coal beds bear some gas and since these coal beds are of non-commercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

Section 13. Gas Wastage:

(a) Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to a commercial or domestic taker shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

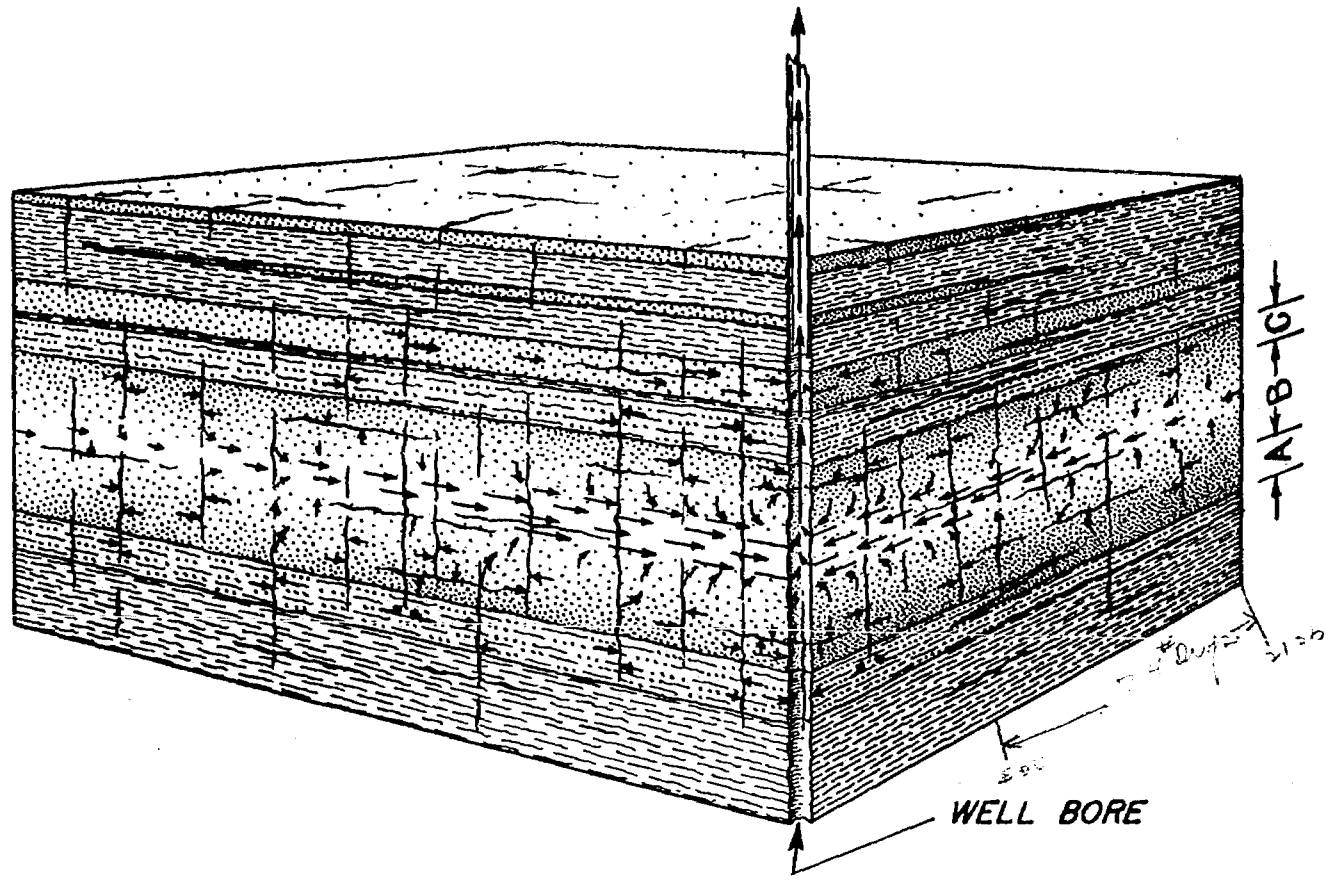
Section 14. Bradenhead Gas:

(a) Bradenhead gas shall not be used either directly or expansively in engines, pumps or torches, or otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

Section 15. Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the pool not conforming to the requirements of Section 1 through 12 above if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the pool in the absence of such exception, or irrespective of such findings, if the Commission shall find that by reason of all circumstances an exception is proper in the prevention of waste, or undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law express or implied.

Section 16. All additional lands located within one mile of any land in the pool as defined above or as it may be extended shall conform to these rules and regulations; provided, however, that by order of this Commission the pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed on the basis of additional developments, to be capable of producing gas from the Mesaverde formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from Mesaverde.

FIGURE 2



SCHEMATIC DRAWING OF MESA VERDE SANDSTONES AND WELL BORE SHOWING FLOW OF GAS IN RESERVOIR WITH WELL PRODUCING.

LEGEND

- SANDSTONE BEDS WITH VERTICAL AND HORIZONTAL FRACTURES.
- SHALE BEDS WITH VERTICAL FRACTURES.
- SHALEY SAND OR SANDY SHALE BEDS WITH VERTICAL AND HORIZONTAL FRACTURES.
- FRACTURES EXPOSED IN WELL BORE.

→ — ARROWS INDICATE DIRECTION OF GAS MOVEMENT.

A & C — SAND ZONES OF LOW PERMEABILITY.

B — SAND ZONES OF HIGH PERMEABILTIY.

— GAS FLOW IN TO FRACTURES.

— GAS FLOW OUT OF FRACTURES.

BLANCO - MESAVERDE GAS POOL

Summary of Data Available for Those Wells With Deliverability Tests

Deliverability Group	No. Wells	Avg. Initial Potential-Mcfd	Average Deliverability Mcfd	Average Production (1) Mcf/Month
-100	16	1 026	63	2 177
100-199	40	2 012	155	4 605
200-299	27	2 242	255	6 890
300-399	19	2 737	349	10 133
400-499	20	2 815	444	9 910
500-599	24	3 555	548	14 147
600-699	15	3 534	654	16 413
700-799	16	4 218	742	15 394
800-899	18	4 139	850	20 156
900-999	29	4 190	948	21 693
1000-1099	20	5 235	1 045	26 302
1100-1199	7	4 517	1 160	26 144
1200-1299	9	5 203	1 240	30 618
1300-1399	7	5 355	1 350	38 059
1400-1499	13	4 922	1 453	37 615
1500-1599	2	6 736	1 542	23 159
1600-1699	4	6 012	1 635	38 307
1700-1799	8	6 602	1 746	42 050
1800-1899	6	6 310	1 865	47 041
1900-1999	6	5 925	1 952	45 641
2000-2099	7	6 704	2 049	45 774
2100-2199	3	4 735	2 158	45 849
2200-2299	2	7 927	2 244	64 989
2300-2399	1	6 800	2 379	40 041
2400-2499	2	6 880	2 469	35 780
2600-2699	3	8 017	2 653	59 378
2700-2799	1	7 921	2 768	64 773
2800-2899	1	683	2 860	73 295
2900-2999	3	6 403	2 931	64 553
3200-3299	1	8 520	3 255	54 109
3500-3599	1	5 452	3 577	48 580
3600-3699	1	7 480	3 690	59 294
5400-5499	1	6 000	5 409	75 739
5800-5899	1	11 000	5 803	97 750
6200-6299	1	14 140	6 237	167 355
7100-7199	1	3 640	7 161	30 650
8200-8299	1	36 285	8 223	149 842
9000-9099	1	23 000	9 015	168 529
9700-9799	2	12 164	9 728	87 340
15900-15999	1	20 300	15 909	146 292
17800-17899	1	19 411	17 840	57 834

(1) Production figure used for each individual well was the maximum production reported for the months of December, 1953, January, 1954, and February, 1954, with the February production being converted by the factor 31/28.

Notes on Case 330

Standard -
... no Testimony.

Pulse	1:10
Resp.	1:20
Headache	none
S.V.	1:00
Reflex	none
Pelvis	rebuttal
Skelly	1:00
T.P.	1:30
Knuckle	none
Patella	none
Coma	1:00

[illegible]

Shelby – Cooper

Ex 1. 355 Del. Centralia – 7th St.

Myers SI ?

Sw. Del ?

Ex 2. Del. map. S/2 of N/2 plat ranges.

17, 7.49? – 1118 – 12.7 Ratio

HD 7490 – 1180 = 1-26. Ratio.

Ex 3. Revenue maps.

Sec. Yield Revenue. ?

Sec 7 to S.I.P. (upper)

Ex. 4

860,000 MCF/Mo.

75 X Ac. + 25 Ac.

Min. 6983 Mo 233/da.

Max. 23337.40 – 7.796/da. 30 times.

50–50.

Min.

Max 5160/dA. 11–1

Sec X Plat

Min. 556 dA.

1:24 dA. 1: 1.34

Rela(t)ts

B.H.P X Average.

? Well Equality

Tank

? What Ratio 1-550 Reserve Ratio
Some say

Ex. 6.

Ex. 5.
7 in Department Reserves.

Dallas C.P.	Bank # 1 -	1067
"	Bank # 2 -	976
Aldine I.S.D.		963
Kendleton		972
Harris Co.	1-18	987
A-P. John #	5	1030
" "	6	1010
		5938
	6	= 988

Sub $\frac{1067}{988}$ = 1:1.67

Reserve $\frac{7915}{6815}$ = 1:1.16

Rubber — Jackson

12900 P...

36 ...

15 ...orates

1. ...to Rimrock.

2. ...Rimrock Rim...

3.

Exh. 1-A. Co...

...Wells in Area.

Exh. 1-B

21N-13W

...Summary of Three wells ...Producing

...Ely Ridge 7 7/8 Pzw

30-6

2-A. 30-12W

2-B. 11-32-12 ...Madison.

Z1.3

Lucas Acre #6 1115
1061
53

1,297 / 53 = 26.371

29.090 MCF
29.379 MCF
320

29,395 / 320 = 91.5 MCF/Ac. 1,100 units/Ac.

400 units Pay.

Kulchis - Reeves

1. Permeability - 100 - 450 - 1 - 4.5
2. Porosity - 4.6 - 15.4 - 1 - 4.35

average 29.4

Average 20 %

Connate H2O. 22 - 60 % - 1:2

Pressures. 933 - 1118 1 - 1.8
1 - 46.4

Open Flow Potential 750 - 23,500 1:33.3

How many. 3 Cores.

Lx. Portion.

How many days used.

of the days.

3 Cores
230,000

$\mu_i = .66$ 1 – 16 Extension

Temp. 153 + 460 = 613° R.

43,560 × .046 × .10 × $\frac{2,363.}{15}$ × 160 = 11.83 M²CF/Ac

1.88 × (1.1105)² × .848 × .91 = 4.09 M²CF/Ac

43,560 × .154 × .80 × $\frac{1050}{16}$ × 1150 = 164.199 M²CF/Ac

164.199 × (1.060)² × .848 × .91 = 140. M²CF/Ac

$\frac{140}{4}$ = 35.0 ft

$\frac{34.5}{230}$ $\frac{230.}{1364}$ M²CF/Ac (630 Net Pay)

$\frac{182}{.360}$ = 505 Net Pay

Based on 750,000 I.P.

Company have an option on Net Revenue

$85,000 – 2,000 net

400 ft Net

Phillipsburg Pet. — W. B. Barry

Rec. on Top.

Cond. on bottom (5 mud) (3 Gas) 1500 ft. above mud

Pipe on bottom. Gas Pot. 10% Wtr. 30%

Pot. at 84 = 13.05 Cor. Pot. 57 M M

Used Pot. of 84 from Section No. 1

Mm. ft. of Pay.

Load Count X .75 = net Pay

Load Count light gray lime some flint and brown sandy + coarse sand rock.

92 to 328 = 3.56 to 1

69 " 246 = 3.42 to 1

1. Low water pressure to increase Recovery.

" 163 Gas Press 3,758. 20 1/

" 1650 shut. 4,960.

2. Point down where Max. water between opposite. 211 5-29-8

351 7-29-8

1 to 1.67

1-31-7-P9.9 25-29-6

25-22-8- 21-28-3 — P 10.38

35-30-6-P9.4 21-29-3

22-30-5.P11.02 20-

29-31-9 — P 6.3 W.P. 11.02/6.3 = 1.75 to 1

19-30-9 W.P. 12 / 1.75

1 — 3.56

1 — 1.75

1 — 6.3

3. Area of high magnitude Net
necessarily coincide with high Resist.
drawing?
none ~~Indicated~~ evident.
Hamilton Bed 2
Sands #1 [illegible]
E.V
Lower Sand #8.
How many Cores
12 + 8 = 22

23,400 / Ac for entire Basin. Clearing Ltd. on E.R.
21,120 / Ac Phillips Range
Phillips — Cullendar

Isochronous Sinking Fund & constant duration?
1952 Later part of Aug Basin.
100 ft Level
75% Net + 25 Silt
50% Net + 50% Silt

25% Net — 75% Silt.
Value dependent on Sinking Fund
in Long Life Field.

Radius, ... 2 10th ...
346 Rel. Wells.
6 — 1 in Del. ... Ry ...
4 — 1 " " " "

1. What kind of ... Reservoir Del.?
Well A Del. 1,000 ... Ry 20 ... Well B Del. 1900 ...
2. Difficulty in Del. ... Vs. E.U.R.
economic
3. Have your Eng. ... Pressures X Sec.

4. If Pressures 1-6 — 1-10 Well ... would you have Recommended. ⅔ — ⅓ DEL 1-5 -1-10

Acreage — Reservoirs.
Pressure — Thickness + Pressures
Thickness — Del. + Pressures
Perm. — must be considered.
Porosity.

1. If .75 A + .25(AXD) ... is equitable for a Reserve ratio of 1-3.5, but made it difficult for a pipeline to gather because of distance, distortion Del. How much weight would you give to the purpose of ... economic ... simple Burden of the P.L. Co ... gathering Res.

P...

El Paso. E. Alameda Woodcliff

Ex 1-A 701 wells on comp with P.C.'s. As of June 7, 1954
EP withdrew Protests 90 + 100 foundations

1½ - 5 - Rare
5 - 10 Rare
10 - 20 Few
20 + Considerable

180 / 5 — 150 ft. Min
6 ft. Min (Commercial) ?

1-7.2 — 1-30

1. What is a commercial well?

2. What Po gradients inside the 20 ft
Contour
Mass 21/1 highest Area Porosity
701 / 6 wells 9490
1-10.7

3. Were any of these wells recompleted.
What Conclusions.

32 Acre
.05
19.200

400 Logs for E.P. 30 min OK.
8" " " "
Balancing [illegible]
[illegible] 731

Mr. Strickland.

[illegible]

S.U. - [illegible]

Comm. 9 to 11 [illegible]

[illegible]

$\frac{750}{150}$ 5 +/ $\frac{2,500.}{250}$ 1-10

Year at .12

Payout Time.

350 Min allowable.

3350
650
17500
+ 10 %
227,500/da. Demand

2,500 Dy allowable,
6000 daily yc + 500 (A x D)

Ref 1 - any 1 each End... Period.

15,625
30

Carlin — Nelkin.

[illegible] 3 0 N-2 W. 2 5 . . . .

May 6 3. (M 7C P/A.) sec. 1

4. 70/12 c.P. A . . . . . sec. 16) Barrick Resources

[illegible]

5 0 - 6 0 °

6 — 13.4 — 1

1.8 — 1

Pronto 7.1 to 13.5 — 2 to 1

10 — 1

1 — 2

Above Key

Notes on Testimony

Exhibit 3

1. Results Study of 1953 Production & Deliverability
   (a) Pipeline A & B Taken between Companies
   (b) " A & B " " Del. Thompson
   (c)

2. Method of Computing
   (a) Deliverability Factors. Prod mcFd / Del. @ 500 psig
   (b) Red & Blue circles indicate actual mcFd for Area wells in Del. & Production. (relationship Del. to Prod. expressed as % of ayfe.
   (c) Prod. Load factors

3. Del. and Prod. Load Factors shown non-notable takeoff the irregular line.

4. Prod. Curve for ~~area~~/well taken from each company.

5. Del. Thompson Pipeline A & B.
   (a) Prod. Load Factor Curve.
   (b) Del. "
   (c) Shows non-notable takeoff between Del. Thompson or wells with ~~not~~ capacities for each pipeline and also non-notable take between pipelines. ~~Shows important~~

6. Daily Area Production Curve.
   (a) Curve showing daily production per well.

(6. (h) Prod. Curve shows a non-uniformable take non-uniformable take between pipelines for each group of wells. The larger the well the more non-uniformable the take is.

Exhibits 4 & 5

1. Corrections.

(a) These geological Corrections are the same shown from A-A' - B-B'. These show net Pay relationships between wells in this local area. These show a very little variation in net pays between wells in this area. It is from 95 ft to 130 ft.

Exhibit 6

1. This exhibit shows the area in Red which is dedicated by the operator to Well X. The Reserves for this area was computed on the following basis. The nearest available core information was a well located in NE 29-31N-9W and another located in SE 19-30N-9W area. Porosity and Sat. No. of these cores was used for the reserve calculation in Red area and also the Blue area. Net Pay given as the thickness in Oreas

2. The Blue area was the dedicated acreage for the 7 offset wells of well X. The net Pay thickness, and Sat. value for the 2 cores was used in computating the Reserves for

the Area - offset drilling tract.
The Reserve for the Red area was
computed to be 7915 MCF for the
325.46 acres or 24.3 MCF/Ac.
The computed Reserve for the
area Blue on offset location
was 6891 MCF for the 320 acres or
21.5 MCF/Ac.
The weighted Ave. daily Production
for ~~the~~ 1953 was 908 MCF.
The weighted Ave. daily Production
for Well X was 4606 MCF/DA.

Exhibit 7.
1. This exhibit shows the
results of a Production Projection
made for Well X and a Pool.
Projection made for the area
offset to Well X. This shows
what could happen between these
areas if these wells were produced
for 15 years in the same relation-
ships as they were produced in
1953.
(N) Explain symbols on Top Rec.
CHENG.
a. Explain decline in O/C.P.
and difference in W.H. P/C.P.

Ex. 9

1.

2. Map

Prod

3. Prod. Curve

4. Prod. Curves for Combination

5. Let

(a) show

between

Tabe

6.

(a) Curve

(b)

the well

Ex 5 x 6

1. ~~Show Act. prop. & the equal~~ Show Ave. ~~Ins~~ Ave. ~~of~~ Log. dol
cumulative ave. ~~for~~ for ~~x~~ years
on which ave. dol. Projections
were made. Check whether
Act Pay relationships between
~~the~~ dollars & Ave. ave. There
seem little variation in pay
~~accross~~ across the ave. 95–130

Ex. 7

1. ~~show~~ the ave. in Red.
for which the ~~ave~~ ~~for~~
Well X were computed.
Also ~~show~~ the ave. in
Blue for which the ave.
of all wells were
computed. The 7 wells
considered in this ave.
(b) ~~show~~ the locations
of the 2 wells for which
core data were taken
that are suitable ~~of~~ ~~the~~ other wells
available.

The Permeability of Well X was 7.915 MzCF 24.3
The ave well was 6.591 MzCF 21.5

Ex. 8.

1. Stel. prop. ~~of~~ ~~in~~ ~~hand~~
of Ave daily 1953 prod. Well X
~~the~~ ave ~~of~~ ~~the~~ ~~ave~~ ~~well~~. ~~The~~
~~dem~~ ~~of~~ ~~the~~ ~~well~~ ~~ave~~ ~~well~~
~~for~~ ~~the~~ ~~ave~~ ~~prod~~ ~~Ave~~
~~of~~ 1953
2. ~~show~~ ~~ave~~ ~~prod~~ ~~in~~
3. ~~Compare~~ ~~Ave~~ ~~well~~ ~~with~~ ~~ave~~

would stand its own damage.

Ex. 9 & 10

1. Show relationship between area, volume, how suitable it is according the machine ability to produce.

2. [illegible] how they will be produced

DELHI OIL CORPORATION
1314 Wood Street
Dallas, Texas

May 26, 1952

Subject: Plan of Development for 1952
Blanco Area, San Juan County,
~~New Mexico.~~

THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

STANOLIND OIL AND GAS COMPANY
OIL AND GAS BUILDING
FORT WORTH, TEXAS

SAN JUAN PRODUCTION COMPANY
BASSETT TOWER
EL PASO, TEXAS

Gentlemen:

Pursuant to Section 2 of the Development Contract for the Blanco Area approved on March 17, 1952, by the Assistant Secretary of the Interior, we transmit herewith Delhi Oil Corporation's Plan of Development for the calendar year 1952.

Yours very truly

DELHI OIL CORPORATION

R. G. Carlin

RGC/ab
Attach.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
MAY 29 1952
RECEIVED

PLAN OF DEVELOPMENT FOR THE CALENDAR YEAR 1952
BLANCO FIELD, SAN JUAN COUNTY, NEW MEXICO

TO: THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

STANOLIND OIL AND GAS COMPANY
OIL AND GAS BUILDING
FORT WORTH, TEXAS

SAN JUAN PRODUCTION COMPANY
BASSETT TOWER
EL PASO, TEXAS

In compliance with Paragraph 2 of the Development Contract for the Blanco Area of the San Juan Basin, New Mexico, approved by the Secretary of the Interior of the United States on March 17, 1952, Delhi Oil Corporation, as an owner of oil and gas leases or of operating rights under oil and gas leases covering lands subject to said Development Contract, does hereby submit for your information an outline of its proposed development program for the calendar year 1952.

1. Past Development History

Three wells have been completed in the Mesaverde Series by Delhi Oil Corporation at the locations listed below:

NE/4	Section 20-T29N-R9W
NE/4	Section 23-T29N-R9W
NE/4	Section 35-T30N-R8W

2. Proposed Additional Wells

It is the plan of Delhi Oil Corporation to complete five additional wells during the remainder of the calendar year 1952.

At present Delhi Oil Corporation is drilling at the following locations and, under normal conditions, these wells should be completed within the next sixty to ninety days:

NE/4	Section 34-T29N-R9W
NE/4	Section 6-T-30N-R8W
SW/4	Section 14-30N-R8W

Additional locations which have been authorized for drilling are, as follows:

SW/4	Section 11-T30N-R9W
NE/4	Section 3-T30N-R9W

It is contemplated that all wells covered in this plan of development will penetrate all or a portion of the Point Lookout formation of the Mesaverde Series.

3. Spacing of Wells

The spacing of wells drilled in all formations down to the base of the Point Lookout in the Mesaverde Series shall conform to the applicable field rules relating to the Blanco Pool as promulgated by the Oil Conservation Commission of the State of New Mexico.

4. Well Casing Program

The well casing program shall conform to the applicable field rules relating to the Blanco Pool, as promulgated by the Oil Conservation Commission of the State of New Mexico, and shall include such other casing as may be required by the Supervisor, the Commission, and the Commissioner.

5. Further Development

This plan of development shall constitute the future drilling obligations of the Delhi Oil Corporation pursuant to the provisions of the Blanco Development Contract for all zones down to and including the Mesaverde Section for the period ending December 31, 1952. It is further agreed that prior to the expiration of this plan of development, another plan of development shall be submitted to the above named addressees for further development of the Blanco Area.

6. Effective Date

This plan of development shall be effective May 24, 1952.

7. Modifications

This plan of development may be modified from time to time with the approval of the Supervisor, the Commissioner, and the Commission to meet changing conditions.

Submitted this 26 day of May, 1952.

DELHI OIL CORPORATION
UNIT OPERATOR

BY W E Smith
Vice-President

May 29, 1952

THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

STANOLIND OIL AND GAS COMPANY
OIL AND GAS BUILDING
FORT WORTH, TEXAS

DELHI OIL CORPORATION
1314 WOOD STREET
DALLAS, TEXAS

Subject: Plan of development for 1952 Blanco Area, San Juan County, New Mexico.

Gentlemen:

Pursuant to Section 2 of the Development Contract for the Blanco Area approved on March 17, 1952, by the Assistant Secretary of the Interior, we transmit herewith El Paso Natural Gas Company's Plan of Development for the calendar year 1952.

Yours very truly,

EL PASO NATURAL GAS COMPANY

By R L Hamelin
Chief Clerk, Lease Record Section

RLH:lg

Encl.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
JUN 5 - 1952

PLAN OF DEVELOPMENT FOR THE CALENDAR YEAR 1952
BLANCO FIELD, SAN JUAN COUNTY, NEW MEXICO

TO: THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

DELHI OIL CORPORATION
1314 WOOD STREET
DALLAS, TEXAS

STANOLIND OIL AND GAS COMPANY
FAIR BUILDING
FORT WORTH, TEXAS

In compliance with Paragraph 2 of the Development Contract for the Blanco Area of the San Juan Basin, New Mexico, approved by the Secretary of the Interior of the United States on March 17, 1942, El Paso Natural Gas Company, as an owner of oil and gas leases or of operating rights under oil and gas leases covering lands subject to said Development Contract, does hereby submit for your information an outline of its proposed development program for the calendar year 1952.

1. Past Development History

Eight wells have been completed already within the calendar year 1952 in the Mesaverde Series by El Paso Natural Gas Company at the locations listed below:

Howell #2-F	W/2	Section 6 - T27N - R7W
Howell #1-F	S/2	" 1 - T27N - R8W
Vandewart #1	W/2	" 12 - T29N - R8W
Riddle #2-A	E/2	" 1 - T29N - R9W
Howell #1-J	W/2	" 3 - T30N - R8W
Howell #3-L	E/2	" 35 - T30N - R8W
Howell #4-L	E/2	" 34 - T30N - R8W
Grambling #1-C	E/2	" 14 - T30N - R10W

2. Proposed Additional Wells

A. It is the plan of El Paso Natural Gas Company to complete 35 additional wells during the remainder of the calendar year 1952.

At present, El Pasc Natural Gas Company is drilling at the following locations and, under normal conditions, these should be completed within the next sixty to ninety days.

Howell #3-F	NE/4	Section	7	- T27N - R7W
Michener #1	SW/4	"	15	- T28N - R9W
McCulley Johnston #1	NE/4	"	15	- T28N - R9W
Neudecker #1	NE/4	"	14	- T29N - R10W
Lackey #3-A	SW/4	"	11	- T29N - R10W
Lackey #2-A	SW/4	"	12	- T29N - R10W
Lackey #1-A	NE/4	"	12	- T29N - R10W
Mansfield #1	SW/4	"	29	- T30N - R9W
Shaw #1	NE/4	"	13	- T30N - R9W
Kelly #1	NE/4	"	35	- T30N - R10W
Riddle #2-B	NE/4	"	23	- T30N - R10W
Grambling #2-C	SW/4	"	14	- T30N - R10W
Grambling #3-C	NE/4	"	12	- T30N - R10W

B. Additional locations which have been authorized for drilling are as follows:

SW/4	Section	17	- T28N - R8W
NE/4	"	19	- T28N - R8W
SW/4	"	21	- T28N - R8W
NE/4	"	36	- T28N - R8W
NE/4	"	11	- T29N - R10W
NE/4	"	26	- T30N - R8W
SW/4	"	26	- T30N - R8W
NE/4	"	27	- T30N - R8W
SW/4	"	27	- T30N - R8W
NE/4	"	33	- T30N - R8W
SW/4	"	33	- T30N - R8W
SW/4	"	24	- T30N - R9W
NE/4	"	10	- T30N - R9W
SW/4	"	3	- T30N - R9W
SW/4	"	20	- T30N - R9W
NE/4	"	25	- T30N - R10W
NE/4	"	23	- T30N - R10W
SW/4	"	23	- T30N - R10W
SW/4	"	33	- T31N - R8W

NE/4 Section 28 - T31N - R8W

NE/4 " 29 - T31N - R8W

NE/4 " 30 - T31N - R8W

It is contemplated that all wells covered in this plan of development will penetrate all or a portion of the Point Lookout formation of the Mesaverde Series.

3. Spacing of Wells

The spacing of wells drilled in all formations down to the base of the Point Lookout in the Mesaverde Series shall conform to the applicable field rules relating to the Blanco Pool as promulgated by the Oil Conservation Commission of the State of New Mexico.

4. Well Casing Program

The well casing program shall conform to the applicable field rules relating to the Blanco Pool, as promulgated by the Oil Conservation Commission of the State of New Mexico, and shall include such other casing as may be required by the Supervisor, the Commission, and the Commissioner.

5. Further Development

This plan of development shall constitute the future drilling obligations of the El Paso Natural Gas Company pursuant to the provisions of the Blanco Development Contract for all zones down to and including the Mesaverde Section for the period ending December 31, 1952. It is further agreed that prior to the expiration of this plan of development, another plan of development shall be submitted to the above named addressees for further development of the Blanco Area.

6. Effective Date

This plan of development shall be effective May 29, 1952.

7. Modifications

This plan of development may be modified from time to time with the approval of the Supervisor, the Commissioner, and the Commission to meet changing conditions.

SUBMITTED THIS 29TH DAY OF MAY, 1952.

EL PASO NATURAL GAS COMPANY

By: O. H. Purkins

Vice President

I-SEC. NO. 921

BLANCO AREA

DEVELOPMENT CONTRACT

THIS AGREEMENT, entered into as of the _____ day of _____, 1952, by and between the parties subscribing hereto, and herein referred to as the "parties hereto",

W I T N E S S E T H:

WHEREAS, the parties hereto own, or may hereafter acquire certain leasehold or operating rights in oil and gas leases covering the lands made subject hereto; and

WHEREAS, timely and adequate development of these leased lands is necessary to secure a firm and sufficient supply of gas for the pipelines that have or may be constructed to furnish a market outlet for natural gas production in the Blanco Area of the San Juan Basin, New Mexico; and

WHEREAS, orderly development and ratable production as among such leases on a coordinated basis as herein provided will serve to conserve a valuable natural resource and will provide a more equitable basis of sharing such resource than would prevail in the absence of this agreement; and

WHEREAS, the Secretary of the Interior, pursuant to Section 17(b) of the Act of February 25, 1920, as amended by Act of August 8, 1946, 60 Stat. 950, 30 U.S.C. Sec. 181 et seq., is authorized, on such conditions as he may prescribe, to approve operating, drilling, or development contracts made by one or more lessees of oil or gas leases, with one or more persons, associations, or corporations, whenever, in his discretion and regardless of acreage limitations provided for in said Act the conservation of natural products or the public convenience or necessity may require it or the interests of the United States may be best subserved thereby; and

WHEREAS, the contracts under which operating rights were or will be acquired with the approval of the Secretary of the Interior as to the Government leases made subject hereto, together with this agreement, constitute an operating, drilling or development contract within the meaning of the above-cited statute.

NOW THEREFORE, the parties hereto agree as follows:

1. Each party agrees that the leasehold or operating rights it holds or owns in the general area covered by this agreement as of the date of its execution hereof, are made subject hereto and are shown on Exhibit "A" hereof, and that any such rights thereafter acquired in such area will be made subject to this agreement in the manner provided in Section 8 hereof. Also, that any and all, Government leases embracing any such lands are listed by serial number on Exhibit "B" hereof.

2. Upon execution of this agreement, each party shall notify each of the other parties and the Supervisor of the United States Geological Survey of its development program for the calendar year 1951 specifying the wells it contemplates drilling on its lands subject hereto for the purpose of obtaining natural gas production in formations from the surface down to the base of the Point Lookout formations of the Mesaverde Series. Thereafter, each party will similarly notify the other parties and said Supervisor on or before the first day of each year of its proposed development program for the next ensuing twelve months period.

3. Each party agrees that any and all wells which may be drilled by it on any of its lands subject to this agreement shall be in conformity with Order No. 799 of the New Mexico Oil Conservation Commission dated February 25, 1949, as the same may be amended from time to time, or in conformity with any order of said Commission which may be issued in substitution for said Order No. 799, and in conformity with any orders of the Supervisor as to Federal lands based on lease terms and applicable regulations.

4. Each party agrees, that so far as is practicable, wells on lands subject hereto, which are connected to a pipeline and capable of delivering gas thereto shall be produced ratably on the basis of an annual calendar year, (January 1 to December 31) or aliquot part thereof for wells connected to a pipeline less than a full year, in proportion to the deliverability of each well determined by the capacity of each such well to produce against a uniform back pressure, such pressure to be that mutually agreed to; provided that

each party shall have a period of twelve months following the calendar year in which production occurs to adjust any overages or underages as between its different properties; provided further, each party shall have the right over a like period to make up any deficiency in its ratable share of production as compared to that of each of the other parties hereto, such plan to afford such priority and such share of the total available market of production from lands subject hereto as will permit the deficiency to be made up within the time allowed; and provided further, that notwithstanding anything herein, production on the lands committed hereto shall not exceed such quantity or rate of production as may be fixed pursuant to any applicable state or Federal law or regulation.

5. Each party agrees to exchange with each of the other parties hereto such well and production data as it may have covering operations under this agreement and to prepare as soon as such information is available a summary of the production on its leased lands for each calendar year including a segregation of any production constituting an adjustment or the make-up of a deficiency pursuant to Section 4, hereof. A copy of such summary shall be furnished the Oil and Gas Supervisor and each of the other parties hereto.

6. Except as may otherwise be expressly provided herein the terms and conditions of the leases made subject hereto shall remain in full force and effect.

7. Each party agrees to dispose of its leasehold or operating rights by January 1, 1960, as to any Federal lease committed hereto to the extent that any such lease embraces undeveloped acreage not within the limits of a known geologic structure of a producing oil or gas field on such date.

8. It is mutually agreed that any lease not committed hereto as of the effective date hereof, but which is located within the general area covered by this agreement, may be included under this agreement by appropriate joinder and, as to Federal lands, upon a determination by the Secretary of the Interior that such inclusion would be in the public interest. Such joinder shall be accompanied by appropriate supplemental Exhibits "A" and "B" hereof and copies thereof

furnished to each of the parties hereto and to the Oil and Gas Supervisor of the Geological Survey.

9. This agreement shall become effective upon approval by the Secretary of the Interior and shall continue in full force and effect throughout the term of each lease committed hereto and, as to each such lease, so long thereafter as gas in paying quantities is produced from any formation between the surface and the base of the Point Lookout formation of the Mesaverde Series, or such production is allocated thereto pursuant to a communitization agreement.

In witness whereof El Paso Natural Gas Company has executed this instrument in counterpart this _____ day of _____, 1952.

Date:_____ EL PASO NATURAL GAS COMPANY

ATTEST:

_____ By:_____

Assistant Secretary Vice President

APPROVAL CERTIFICATE

Pursuant to the Act of February 25, 1920, Section 17(b), as amended by Act of August 8, 1946, 60 Stat. 950, 30 U.S.C. Sec. 181 et seq., I do hereby:

A. Approve the attached agreement covering the development of certain natural gas deposits in the Blanco area of the San Juan Basin, New Mexico.

B. Determine that such agreement is in the interest of conservation and that the interests of the United States may be best subserved thereby.

C. Determine that operating agreements with the owners of the Government leases listed in Exhibit "B" of said attached agreement, now or hereafter made and approved, and pursuant to which operations shall be carried on in conformity with the provisions of said attached agreement, may be held without regard to the acreage limitations prescribed by said Act and the acreage of such leases is exempted in the computation of chargeable acreage to the holders of such operating agreements under this Act.

Date: _____ _____

FORM 829 2-49

STANOLIND OIL AND GAS COMPANY

OIL AND GAS BUILDING

FORT WORTH, TEXAS

C. F. BEDFORD
DIVISION PRODUCTION SUPERINTENDENT

May 14, 1952

File: RWH-6223-216.79

Subject: Plan of Development for 1952
Blanco Area, San Juan County,
New Mexico

THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

DELHI OIL CORPORATION
1314 WOOD STREET
DALLAS, TEXAS

SAN JUAN PRODUCTION COMPANY
BASSETT TOWER
EL PASO, TEXAS

Gentlemen:

Pursuant to Section 2 of the Development Contract for the Blanco Area approved on March 17, 1952 by the Assistant Secretary of the Interior, we transmit herewith Stanolind Oil and Gas Company's Plan of Development for the calendar year 1952.

Yours very truly,

C F Bedford

RWH/mc
Attach.

MAY 19 1952

PLAN OF DEVELOPMENT FOR THE CALENDAR YEAR 1952
BLANCO FIELD, SAN JUAN COUNTY, NEW MEXICO

TO: THE OIL AND GAS SUPERVISOR
U. S. GEOLOGICAL SURVEY
ROSWELL, NEW MEXICO

COMMISSIONER OF PUBLIC LANDS
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
SANTA FE, NEW MEXICO

DELHI OIL CORPORATION
1314 WOOD STREET
DALLAS, TEXAS

SAN JUAN PRODUCTION COMPANY
BASSETT TOWER
EL PASO, TEXAS

In compliance with Paragraph 2 of the Development Contract for the Blanco Area of the San Juan Basin, New Mexico, approved by the Secretary of the Interior of the United States on March 17, 1952, the Stanolind Oil and Gas Company, as an owner of oil and gas leases or of operating rights under oil and gas leases covering lands subject to said Development Contract, does hereby submit for your information an outline of its proposed development program for the calendar year 1952.

1. Past Development History

Seven wells have been completed in the Mesaverde Series by Stanolind Oil and Gas Company at the locations listed below:

NW/4	Section	14-T29N-R9W
NE/4	"	15-T29N-R9W
NE/4	"	11-T29N-R9W
NE/4	"	5-T29N-R9W
SW/4	"	4-T29N-R9W
NE/4	"	3-T29N-R9W
SW/4	"	34-T30N-R9W

2. Proposed Additional Wells

It is the plan of the Stanolind Oil and Gas Company to keep two rigs in continuous operation for the remainder of the calendar year 1952, and under normal operating conditions, this should provide for the drilling of approximately twelve (12) additional wells during this period. Although we contemplate no unusual difficulty or delay, the full realization of this program must be made contingent

upon the final execution of the appropriate attendant instruments, i.e., Communitization Agreement, Operating Agreement, or Declaration of Operator, as required.

At present, Stanolind has two rigs in operation drilling wells at the following locations:

SW/4 Section 9-T29N-R9W

SW/4 " 15-T30N-R9W

Additional locations which have been authorized for drilling are as follows:

NE/4 Section 14-T30N-R9W

SW/4 " 14-T29N-R9W

SW/4 " 27-T30N-R9W

It is contemplated that all wells covered in this plan of development will penetrate all or a portion of the Point Lookout formation of the Mesaverde Series.

3. Spacing of Wells

The spacing of wells drilled in all formations down to the base of the Point Lookout in the Mesaverde Series shall conform to the applicable field rules relating to the Blanco Pool as promulgated by the Oil Conservation Commission of the State of New Mexico.

4. Well Casing Program

The well casing program shall conform to the applicable field rules relating to the Blanco Pool, as promulgated by the Oil Conservation Commission of the State of New Mexico, and shall include such other casing as may be required by the Supervisor, the Commission, and the Commissioner.

5. Further Development

This plan of development shall constitute the future drilling obligations of the Stanolind Oil and Gas Company pursuant to the provisions of the Blanco Development Contract for all zones

down to and including the Mesaverde Section for the period ending December 31, 1952. It is further agreed that prior to the expiration of this plan of development, another plan of development shall be submitted to the above named addressees for further development of the Blanco Area.

6. Effective Date

This plan of development shall be effective April 1, 1952.

7. Modifications

This plan of development may be modified from time to time with the approval of the Supervisor, the Commissioner, and the Commission to meet changing conditions.

Submitted this 15 day of May, 1952.

STANOLIND OIL AND GAS COMPANY
UNIT OPERATOR

BY _____
ITS ATTORNEY-IN-FACT

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEWMEXICO

CASE 330: By terms of Order R-128 this case was continued to this date from a special hearing on December 18, 1951. It is concerned with Stanolind's petition relating to proration of natural gas in the Blanco-Mesaverde gas pool, San Juan County. A year's extension was given so that evidence might be compiled with reference to interim production experience in the pool.

TRANSCRIPT OF HEARING

December 16, 1952

BEFORE: Hon. Ed. Mechem, Governor and Chairman
Hon. Guy Shepard, Land Commissioner and Member
Hon. R. R. Spurrier, Director and Member

STATE OF NEW MEXICO
ss
COUNTY OF BERNALILLO

I HEREBY CERTIFY That the within transcript of hearing in the above-styled case before the Oil Conservation Commission of the State of New Mexico is a true record of the same to the best of my knowledge, skill, and ability.

DONE at Albuquerque, New Mexico, December 20, 1952.

E. E. Greeson
Reporter

MR. SPURRIER: The next case on the docket is Case 330.

MR. SMITH: I am J. K. Smith of Stanolind Oil & Gas Company.

This matter came on for hearing last December and was continued for a year for the purpose of compiling intermin production experience in the pool. We feel our applicationand evidence offered last December were adequate to justify the promulgation by the commission of proration rules in the Blanco Mesaverde Pool. However, there has been no significant change in the production history out there since last December. And I understand a committee has been studying the feasibility and the type of test to be taken to determine the potential of the wells. I am not familiar with that particular phase of the activity, that is so far as the committee's program is concerned. But we have nothing to suggest at this time and suggest that the Commission postpone the hearing to a further date.

I believe that Mr. Hollis of El Paso Natural has some information concerning the progress the committee has made on the taking of these potential tests.

Is he here?

MR. HOLLIS: Yes.

MR. SPURRIER: Mr. Hollis.

MR. HOLLIS: This testing committee at Farmington is a subcommittee under the New Mexico Oil & Gas Engineering Committee. And we feel within the last two or three months has made quite a bit of progress toward arriving at a basis for a standard testing procedure. We have what the companies have accumulated, test data which they have turned over to this engineering committee. This data is being compiled and shortly this committee will submit a letter to the management of each operator in the Basin. If the management approves this testing procedure, the committee will ask for a hearing from the State. And at that time the data and the testing procedure will be presented.

We think we have some good information and I would say probably the latter part of the first quarter of '53 we will be able to ask for a hearing.

MR. SPURRIER: Thank you.

MR. SMITH: I would like to suggest to the Commission that the hearing be continued until the August hearing 1953. I believe by that time we may have more significant production data to give than we do at this time. I am inclined to think any information at this time may be misleading. Some of the wells have just been completed and I think evidence at this time would be premature.

MR. SPURRIER: Anyone else have a comment in this case?

MR. DAVIS: My name is Quilman Davis, representing the Southern Union Gas Company.

We would like to recommend also this hearing in Case No. 330 be postponed until August the 18th.

MR. NEAL: My name is Caswell Neal of the Three States Natural. We also recommend postponement.

MR. JONES: I represent the Delhi Oil Corporation. We concur in this request for postponement until the August hearing.

MR. HOWELL: I represent the El Paso Natural Gas Company. We also concur in the request for a postponement until the August hearing.

MR. SPURRIER: Anyone else?

MR. PARSONS: My name is Critchell Parsons, representing the Beaver-Lodge Oil Corporation. We also concur.

lb

MR. SPURRIER: Is there any objection to Stanolind's motion for continuance to the August hearing? The case will be continued to the August hearing.

_____o_____

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 330
Order No. R-128-A

THE APPLICATION OF STANOLIND OIL
AND GAS COMPANY FOR THE AMENDMENT
OF ORDER NO. R-110 RELATING TO THE
BLANCO-MESAVERDE POOL, SAN JUAN
AND RIO ARRIBA COUNTIES, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This matter came on for hearing at 9 o'clock a.m. on September 17, 1953, after numerous previous hearings and continuations for additional studies and information.

NOW, on this 10th day of November, 1953, the Commission, a quorum being present, having considered the testimony adduced, the motions and statements of the several interested parties, and being fully advised in the premises,

FINDS:

(1) That due notice has been given as required by law, and the interested parties have appeared in person or by attorney.

(2) That under certain represented engagements and agreements between gas purchasers in the Blanco-Mesaverde Pool, a program has been initiated in said pool as of September 1, 1953, designed to bring about ratable withdrawal from the wells and areas therein, the prevention of waste by drainage, and thus the protection of correlative rights.

(3) That the Commission is unable to appraise the project, in the absence of detailed information, copies of agreements, and monthly production information covering each producing well in such pool, for the calendar year 1953.

IT IS THEREFORE ORDERED:

(1) That the applicant, Stanolind Oil and Gas Company, Southern Union Gas Company, Southern Union Gathering Company, and El Paso Natural Gas Company, or either or all of them, on or before December 1, 1954, provide the Commission with a true copy of each and all agreements negotiated between the purchasing companies represented as beginning September 1, 1953, and designed to provide equitable withdrawal of gas from all wells in the Blanco-Mesaverde Pool.

(2) That the applicant, Stanolind Oil and Gas Company, Southern Union Gas Company, Southern Union Gathering Company, and El Paso Natural Gas Company, or either or all of them, shall prior to March 1, 1954, provide the Commission with production figures of each producing well in said pool by months beginning January 1, 1953, and ending December 31, 1953.

(3) That the applicant and all purchasing companies in the Blanco-Mesaverde Pool are hereby ordered to appear at the regularly advertised Commission hearing for the month of April 1954 and show cause why a final order based upon the record, the information required herein, and additional testimony, if any, should not be issued and filed.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

R. R. SPURRIER, Secretary and Member

SEAL

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 330
ORDER NO. R-128-B

THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR THE AMENDMENT OF ORDER R-110 RELATING TO THE BLANCO-MESAVERDE POOL, SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO.

NUNC PRO TUNC
ORDER OF THE COMMISSION

BY THE COMMISSION:

It appearing to the Commission that Order No. R-128-A heretofore entered in this cause is not a correct memorial of the judgment as rendered and announced by the Commission under date of November 10, 1953, by reason of clerical error, in that the order read as follows:

"It Is Therefore Ordered:

(1) That the applicant, Stanolind Oil and Gas Company, Southern Union Gas Company, Southern Union Gathering Company, and El Paso Natural Gas Company, or either or all of them, on or before December 1, 1954, provide the Commission with a true copy of each and all agreements negotiated between the purchasing companies represented as beginning September 1, 1953, and designed to provide equitable withdrawal of gas from all wells in the Blanco-Mesaverde Pool."

when it should have read as shown below:

"It Is Therefore Ordered:

(1) That the applicant, Stanolind Oil and Gas Company, Southern Union Gas Company, Southern Union Gathering Company, and El Paso Natural Gas Company, or either or all of them, on or before February 1, 1954, provide the Commission with a true copy of each and all agreements negotiated between the purchasing companies represented as beginning September 1, 1953, and designed to provide equitable withdrawal of gas from all wells in the Blanco-Mesaverde Pool."

IT IS THEREFORE ORDERED:

That Order R-128-A heretofore entered by this Commission in the above-entitled cause on November 10, 1953, be and the same hereby is corrected to conform to the actual judgment as rendered by the Commission by correcting and modifying above-stated Section (1) of the order portion to show the date February 1, 1954, instead of December 1, 1954, and said Order R-128-A in all other respects is hereby ratified and confirmed; and

IT IS FURTHER ORDERED: That this order correcting the record of said order be entered nunc pro tunc as of the 10th day of November, 1953, that being the date when said Order R-128-A was originally made and entered.

DONE this 17th day of December, 1953, at Santa Fe, New Mexico.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Edwin L. Mechem, Chairman

E. S. Walker, Member

R. R. Spurrier, Member and Secretary

S E A L

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

November 12, 1953

COPY

Stanolind Oil & Gas Company
Box 1410
Ft. Worth, Texas

Attention: Mr. R. O. Hilts

Gentlemen:

We enclose signed copy of Order R-128-A issued by this Commission in Case 330, which was last presented before the Commission on September 17, 1953.

You will note that further presentation is called for at the Commission's regular hearing in April, 1954.

Very truly yours,

W. B. Macey
Chief Engineer

WBM:nr

cc: Mr. Quilman Davis
Southern Union Gas Co.
Dallas, Texas

El Paso Natural Gas Company
Attention: Mr. Ben Howell
El Paso, Texas

EXECUTIVE COMMITTEE OFFICERS
FRANK BARNES, Chairman
Consultant & Kinsley-Locke
F. P. CRUM, Vice Chairman
J. D. Hancock & Co.
TOM BOLACK, Sec.-Treas.
Independent

San Juan Basin Operators Committee
211½ WEST MAIN STREET
FARMINGTON, NEW MEXICO

December 20, 1953

EXECUTIVE COMMITTEE MEMBERS
AL GREER, JR., Benson-Montin
W. T. HOLLIS, El Paso Natural Gas Co.
J. B. HOWELL, Delhi Oil Corp.
CLAUDE TEEL, Skelly Oil Co.
D. LOOS, Blackwood-Nichols
G. W. R. HOY, Attorney

RECEIVED
DEC 21 1953

Case 320

Mr. R. R. Spurrier
Secretary and Director
New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Dick:

In answer to your letter of December 14, 1953, we would be very happy to have Elvis Utz as the Oil Commission's representative at the Sub-Committee meetings to study pro-ration in the San Juan Basin. It would appear at the moment as if there will be a large measure of cooperation from the various operators in our organization regarding this pro-ration study. The only problem will be to see if we can seperate personally interest sufficiently to make a reasonably objective study.

At this point we have decided to hold the pro-ration meetings in Santa Fe on the day before the regular Oil Commission hearings. This will save time, travel and money since most of the operators have a representative in Santa Fe at this time anyway.

We certainly appreciate the cooperation of the Oil Commission and we will do everything possible to arrive at some conclusion or to prepare a recommendation at the earliest possible date.

Very truly yours,

Frank

Frank C. Barnes
Chairman

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

December 21, 1953

Stanolind Oil & Gas Company
Box 1410
Ft. Worth, Texas

Attention: Mr. R. O. Hiltz

Gentlemen:

We enclose a copy of Order R-128-B issued by the Commission nunc pro tunc in Case 390.

Very truly yours,

W. B. Macey
Chief Engineer

WBM:nr

cc: Mr. Quilman Davis
Southern Union Gas Co.
Dallas, Texas

El Paso Natural Gas Co.
Attention: Mr. Ben Howell
EL PASO TEXAS

CASE 330: (Continued Case) Stanolind's application for proration of natural gas in the Blanco-Mesaverde Pool, San Juan County, New Mexico, and has been successively continued to permit the compilation of production data.

TRANSCRIPT OF HEARING
September 17, 1953

BEFORE: Honorable E. S. Walker, Land Commissioner
Honorable R. R. Spurrier, Secretary-Director, OCC

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I HEREBY CERTIFY That the within transcript of proceedings before the Oil Conservation Commission is a true record of the same to the best of my knowledge, skill and ability.

DONE at Santa Fe, New Mexico, this 21st day of September, 1953

Virginia M. Chavez
Virginia M. Chavez
Notary - Reporter

My Comm. Ex.:
August 8, 1956

CASE 330: (a continued case)

(Mr. Graham reads the advertisement.)

MR. CHAIRMAN: Quilman Davis, representing Southern Union Gas Company. With the consent of Stanolind Oil & Gas Company, applicant in this case, we would like to make a statement and present the Commission information we have concerning these negotiations in the Blanco field of San Juan County and the entire San Juan Basin, whereby we think that we can work out on a voluntary basis, ratable withdrawals from those wells in the San Juan Basin. As I told the Commission in August, we were negotiating with El Paso contracts that would permit us to deliver gas to them in the Blanco field. Shortly after the first of September those contracts were completed and the contract was made between El Paso Natural Gas Company and Southern Union Gathering Company, subsidiary created by Southern Union to take over the gathering of Natural gas in a three township area in Townships 29, 30 and 31 North, Ranges 8, 9, and 10 West. Southern Union Gathering Company will take over operation of approximately 80 wells or more and eventually perhaps we'll have a hundred, connected to its systems. It in turn will deliver gas to El Paso Natural Gas Company in the field and this operation will relieve Southern Union Gas Company from the obligation to purchase based upon 1952 figures, of some 6 or 7 billion from this particular area while, in affect that represents about one-third of Southern Union Gas Company's requirements from the area during 1952. Now, with this, high falluted transaction in this case, we expect very shortly to be able to increase the withdrawals from our other

wells in the San Juan Basin area by 50%. We, of course are going to be experimenting with this for some time in an effort to work out ratable withdrawals. We feel like that it will take some time to do that.

MR. SPURRIER: Excuse me, Mr. Davis - when you say other wells in the San Juan Basin, do you mean Pictured Cliffs production in addition to Mesaverde?

A. We hope that eventually this program will make an equitable withdrawal or ratable withdrawal from all wells in the San Juan Basin. The arrangements with El Paso are general and provide that El Paso will attempt to take from us in the Mesaverde-Blanco field gas, which will in effect give a ratable withdrawal from all wells connected to Southern Union Gathering Company's system between the wells connected to the El Paso system in the entire San Juan Basin. Now, that includes Mesaverde as well as Pictured Cliffs wells. As I have stated what we have done in affect here is set up the vehicle by which the two pipeline companies are operating at the present time may make exchanges of gas in the field and thereby help a ratable withdrawal. Now, we know that this can't be done over night and I think most of the operators realize that it can't be done overnight. We are attempting to make this retroactive - this withdrawal retroactive to September 1, 1953. Further, it's possible that this gathering company will be increased as experience shows Southern Union and El Paso that additional deliveries need to be made to get ratable take. Now, there's still an awful lot of development particularly in the Mesaverde section up there and as far as we know there is no gas being

flared and we think that immediate rules of proration would be definitely inadvisable right now and we are asking the Commission to, both Southern Union and El Paso, for a year or we prefer to have it until October or November of next year as a trial period with which we can experiment with the takes and the matter of allocation to work out a ratable withdrawal.

MR. SPURRIER: Are there any questions of this gentleman?

MR. HILTZ: R. G. Hiltz for Stanolind. I would like to advise the Commission that Stanolind is in agreement with the conclusions that have been reached by El Paso and Southern Union. We believe they have a workable plan and we strongly urge the Commission to approve the request of Southern Union for at least continuance of this program until October or November of next year to determine whether or not it will ultimately represent the most feasible plan for ratable take in the field.

MR. SPURRIER: Any one else to be heard?

MR. ZINN: Frank Zinn, Attorney at Santa Fe. I represent Kingsley-Locke, King Lock & Quemado Production Companies, small independent operators in the Blanco-Mesaverde area. I wish to state in their behalf the same objections that were raised a year ago which is principally that there is not sufficient data or information to base any proper proration on our situation. The three companies have 28 wells up there, some of them are not even tied in yet. They've not completed deliverability tests up there and it is our view that any proration consideration at this time is premature by - as Mr. Davis says - a year or more.

We ask that this whole matter be deferred until such time as further development and further statistics are available and one further thing we'd like to ask in behalf of at least the independents we represent that if these negotiations by Southern Union and El Paso are to be something of record and information available to the Commission, we ask that the independent be notified of it. The small operators won't know what's happened to them until the Commission meeting next year unless we are advised. Thank you.

MR. SPURRIER: Is there anyone else to be heard?

MR. HOWELL: My name is Ben Howell. I am representing the El Paso Natural Gas Company in this matter. The El Paso Natural Gas Company concurs with Southern Union in the application for continuance for a year - a year and a month or two which would permit two six month's periods in which the two companies can work out balancing procedures on the wells that are connected.. In that connection we know of no flaring of gas taking place or waste in that area. We do know that there will be substantial work necessary out in the field in making a workable ratable take. We do know that there are dozens of wells that will be concluded within this next year, probably as many as five hundred. We do know that there are dozens of wells which the tie-in crews haven't gotten to yet and won't get to for some time, and we think that any attempt to set proration at this particular time will be premature.

MR. SPURRIER: Is there any one else?

MR. CHAIRMAN: Trevor Reese Jones representing Delhi Oil

Corporation. As you know, Delhi is one of the major producers in the Blanco-Mesaverde pool. We have been vitally concerned in the negotiations between El Paso and Southern Union and have been a party to certain of the negotiations. We have a new contract with Southern Union Gathering, dated August 31, 1953 which went into effect September 1, 1953. We are eminently satisfied with this contract and believe that it will take probably as Mr. Davis said, a year to compile data and determine whether or not there is a ratable take - that is the keynote of the contract and we are satisfied with it. We therefore, concur in the request of Mr. Davis and Stanolind for a postponement of this case until the November 1954 hearing.

MR. SPURRIER: Is there anyone else? If not, we will take the case under advisement and we will take a five minute recess.

NEW MEXICO OIL CONSERVATION COMMISSION

Regular Hearing

9:00 a.m. August 20, 1953

MR. DAVIS: Quilman Davis, representing Southern Union Gas Company. For the last several months, Southern Union Gas and El Paso Natural representatives have been conferring with each other in an effort to adjust the withdrawals of gas in the San Juan Basin.

It looks like that we have now arrived at a possible satisfactory solution to that problem there and we expect to put some plan in effect by September 1st. However, the contracts involved in this arrangement have not been signed and with the consent of the applicants, Southern Union Gas would like to request the Commission to continue this case until the September hearing, at which time, we feel certain we would be in a position to present some very definite information and some definite committments in that area.

MR. SMITH: J. K. Smith, Stanolind Oil and Gas Company. The postponement for one month is acceptable to Stanolind. We have no objection.

MR. SPURRIER: Anyone else to be heard? Is there any objection to Mr. Davis' motion?

Without objection, the case will be continued to the regular September hearing.

Next case on the docket is Case 377.

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

CASE 330: Previously advertised and continued from December 16, 1952. Stanolind's application relating to the proration of natural gas in the Blanco-Mesaverde Pool, San Juan County.

TRANSCRIPT OF HEARING

August 20, 1953

BEFORE: Honorable Ed. L. Mechem, Governor
Honorable E. S. Walker, Land Commissioner
Honorable R. R. Spurrier, Director, OCC

STATE OF NEW MEXICO)
) ss.
COUNTY OF LOS ALAMOS)

I hereby certify that the within transcript of proceedings before the Oil Conservation Commission is a true record of the same to the best of my knowledge, skill and ability.

TRANSCRIBED at Los Alamos, New Mexico this 21st day of August, 1953.

Audrey M. Henrickson
Notary Public

My Commission Expires September 22, 1955.

Case 330 — 330-A

El Paso Natural Gas Company

TENTH FLOOR BASSETT TOWER

El Paso, Texas

MAIN OFFICE OCC

1954 JUL 23 AM 9:47

ADDRESS REPLY TO:
1006 MAIN STREET — ROOM 1901
HOUSTON 2, TEXAS

July 21, 1954

Mr. William B. Macey, Secretary Director
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Dear Mr. Macey:

You will find attached a supplemented copy of those rules previously submitted by El Paso Natural Gas Company for use in the Blanco Mesaverde Gas Pool. These rules vary from those previously submitted due to changes in the provisions of Rule 9 and Rule 14.

Respectfully submitted,

F. Norman Woodruff

F. Norman Woodruff

FNW:sm
Attach.
cc: Mr. Ben R. Howell

EL PASO NATURAL GAS COMPANY

PROPOSED RULES AND REGULATIONS
FOR THE BLANCO MESAVERDE GAS POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS

RULE 1. Any well drilled a distance of one mile or more from the outer boundary of the Blanco Mesaverde Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile from the outer boundary of the Blanco Mesaverde Gas Pool shall be spaced, drilled, operated and prorated in accordance with the Regulations in effect in the Blanco Mesaverde Gas Pool.

RULE 2. Each well drilled or recompleted within the Blanco Mesaverde Gas Pool shall be located on a tract consisting of not less than a half section of approximately 320 surface contiguous acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys.

RULE 3. Each well drilled within the Blanco Mesaverde Gas Pool shall be located in the northeast or southwest quarter of the section but shall not be drilled closer than 660 feet to any outer boundary line of such quarter section nor closer than 330 feet to a quarter-quarter section or subdivision inner boundary nor closer than 1320 feet to a well drilling to or capable of producing from the same pool.

RULE 4. The Secretary of the Commission shall have authority to grant exception to the requirements of Rules 2 and 3 where application has been filed in due form and such exception is required because of conditions resulting from previously drilled wells in the area or, in the case of Rule 3, the necessity of exception is based on topographic conditions.

Applicants shall furnish all operators of leases offsetting the lease containing subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all such operators, together with a written stipulation that all such operators have been properly notified. The Secretary of the Commission shall wait at least 20 days before approving any such exception and shall approve such exception only in the absence of objection of any offset operators. In the event an operator objects to the exception the Commission shall consider the matter only after proper notice and hearing.

RULE 5. The provision of Statewide Rule 104 Paragraph (k), shall not apply to the Blanco Mesaverde Gas Pool.

GAS PRORATION

RULE 6. The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Mesaverde Gas Pool and other relevant data and shall fix the

allowable production in the Blanco Mesaverde Gas Pool, and shall allocate production among the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility upon a reasonable basis and recognizing correlative rights, and shall include in the proration of such pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well.

PRORATION UNITS

RULE 7. A. For the purpose of gas allocation in the Blanco Mesaverde Gas Pool a standard proration unit shall consist of approximately 320 contiguous surface acres consisting of the North, South, East or West half of a section and being a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in paragraph B. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

B. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A without notice and hearing:

1. Where the unorthodox size or shape of the tract is due to a variation in legal subdivision of the U. S. Public Land Surveys; or

2. Where application has been filed in due form and where the following facts exist and the following provisions are complied with:

a. The acreage assigned the non-standard unit lies wholly within a legal section.

b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

(2) a list of names and addresses of all operators outlined in paragraph (1), together with a stipulation that proper notice has been given said operators at the addresses given and no objection is received by the Commission from such operators within 20 days after the Commission receives such application.

d. The entire non-standard proration unit may reasonably be presumed to be productive of gas.

e. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

C. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A after notice and hearing, when the operator is unable to comply with the provisions of Rule 7 B.

GAS ALLOCATION

RULE 8. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Mesaverde Gas Pool.

When a purchaser of gas, after filing its nominations for the proration period shall find that its requirements for gas have increased or decreased from the amount nominated for any month during the proration period, such purchaser shall indicate its revised estimated requirements during such month by filing supplemental nominations with the Commission at least three days prior to the regular hearing of the Commission for the month preceding such changed requirements.

All nominations shall be filed on a form prescribed by the Commission.

RULE 9. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for the gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month, together with an adjusted allowable computation for the second preceding month, said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowable assigned the top allowable units shall be reduced proportionately; and in the event the allowable assigned is less than the production, then the allowable assigned the top allowable units shall be increased proportionately.

The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool shall be divided and allocated among the wells appearing on the proration schedule in the following manner: (1) a tentative allocation shall be made by dividing seventy-five per cent (75%) of the pool allocation among said wells in the proportion that the product of each well's calculated deliverability multiplied by the acreage comprising the standard proration unit or approved non-standard unit upon which the well is located bears to the sum of such products for all the wells on

the proration schedule; (2) the remaining twenty-five per cent (25%) of the pool allocation shall be divided among said wells in the proportion that the acreage comprising the proration unit of each well bears to the sum of the acreage comprising the proration unit of all wells appearing on the proration schedule. When the tentative allowable received by a well is in excess of its known producing ability, the well shall be classified as a marginal well and shall have its allowable limited to its producing ability. The sum of the difference between the tentative allowables and the limited allowables of all marginal wells on the proration schedule shall be reallocated to the non-marginal wells by application of the same formula. If such reallocation shall result in placing any other well within the marginal classification, the difference between the tentative allowable and the limited allowable of such marginal well shall be redistributed by application of the same formula until no well has received an allowable in excess of its known producing ability.

The calculated deliverability mentioned in the preceding paragraph shall be that deliverability as determined by a test taken in accordance with the provisions of Order No. R-333 or Order No. R-333A of the New Mexico Oil Conservation Commission or any amendments thereof. At the time of institution of proration, a connected well having no deliverability tests shall have its deliverability estimated as eighteen per cen (18%) of its three hour initial potential pending completion of its deliverability test. A temporary allowable shall be assigned such well using the estimated deliverability in the allocation formula until the deliverability test is taken, at which time those previous allowables granted the well by use of the estimated deliverability shall be revised by use of the actual calculated deliverability. In like manner the estimated deliverability for a well that is connected during the period between the end of one annual deliverability test and the beginning of the next annual deliverability test shall be determined and used for proration purposes pending the completion of the deliverability test for such a well. After the well is connected, the operator may elect to test the well in accordance with the procedure prescribed in Order No. R-333 or in Order No. R-333A for the annual deliverability test or to postpone such test until the next annual deliverability test period.

BALANCING OF PRODUCTION

RULE 10. Underproduction: The dates 7:00 A.M., March 1, and 7:00 A.M., September 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the first succeeding proration period in addition to the normal gas allowable for such succeeding period. That portion of such cumulative underproduction carried forward into the first succeeding proration period, which is not made up during said period shall be deducted from the total underproduction at the end of the period, resulting in only that volume of underproduction accrued during said period being carried forward as cumulative underproduction into the next succeeding proration period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce. All underproduction accumulated to a well classified as marginal shall be added to the allocation for non-marginal wells and distributed thereto. While classified as a marginal well, the well shall accrue neither underproduction nor overproduction and its actual production shall be restricted only by the allowable it would have been assigned if it had been a non-marginal well.

RULE 11. Overproduction: An operator will be allowed to overproduce a well during a proration period and to accumulate and carry over such overproduction into the first succeeding proration period in an amount not in excess of the total allowable assignable to the well based on nominations for the first succeeding proration period. Should the allowable so calculated be less than the accumulated overproduction at the beginning of the first succeeding proration period, the well must be shut-in until the overproduction has been reduced to such allowable. Should the well's cumulative status not be brought in balance during the first succeeding proration period, that overproduction accumulated at the end of the first succeeding proration period must be brought in balance during the second succeeding proration period or the well must be shut-in at the end of the second succeeding proration period until its cumulative status is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 12. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 13. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 14. The monthly gas production from each gas proration unit shall be metered separately and the gas production therefrom shall be reported to the Commission by the operator so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, heaters, treaters, combustion engines and other similar lease equipment and that gas vented in testing or as required to maintain production shall not be charged against the well's allowable.

Copies of Form C-115, Monthly Production Report, submitted in compliance with Rule 14, shall be distributed by the operator as follows: Original to Oil Conservation Commission, Box 871, Santa Fe; two copies to Oil Conservation Commission, Box 697, Aztec, New Mexico.

EL PASO NATURAL GAS COMPANY

PROPOSED RULES AND REGULATIONS
FOR THE BLANCO MESAVERDE GAS POOL
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS

RULE 1. Any well drilled a distance of one mile or more from the outer boundary of the Blanco Mesaverde Gas Pool shall be classified as a wildcat well. Any well drilled less than one mile from the outer boundary of the Blanco Mesaverde Gas Pool shall be spaced, drilled, operated and prorated in accordance with the Regulations in effect in the Blanco Mesaverde Gas Pool.

RULE 2. Each well drilled or recompleted within the Blanco Mesaverde Gas Pool shall be located on a tract consisting of not less than a half section of approximately 320 surface contiguous acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys.

RULE 3. Each well drilled within the Blanco Mesaverde Gas Pool shall be located in the northeast or southwest quarter of the section but shall not be drilled closer than 660 feet to any outer boundary line of such quarter section nor closer than 330 feet to a quarter-quarter section or subdivision inner boundary nor closer than 1320 feet to a well drilling to or capable of producing from the same pool.

RULE 4. The Secretary of the Commission shall have authority to grant exception to the requirements of Rules 2 and 3 where application has been filed in due form and such exception is required because of conditions resulting from previously drilled wells in the area or, in the case of Rule 3, the necessity of exception is based on topographic conditions.

Applicants shall furnish all operators of leases offsetting the lease containing subject well a copy of the application to the Commission, and applicant shall include with his application a list of names and addresses of all such operators, together with a written stipulation that all such operators have been properly notified. The Secretary of the Commission shall wait at least 20 days before approving any such exception and shall approve such exception only in the absence of objection of any offset operators. In the event an operator objects to the exception the Commission shall consider the matter only after proper notice and hearing.

RULE 5. The provision of Statewide Rule 104 Paragraph (k), shall not apply to the Blanco Mesaverde Gas Pool.

GAS PRORATION

RULE 6. The Commission after notice and hearing, shall consider the nominations of gas purchasers from the Blanco Mesaverde Gas Pool and other relevant data and shall fix the

allowable production in the Blanco Mesaverde Gas Pool, and shall allocate production among the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility upon a reasonable basis and recognizing correlative rights, and shall include in the proration of such pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well.

PRORATION UNITS

RULE 7. A. For the purpose of gas allocation in the Blanco Mesaverde Gas Pool a standard proration unit shall consist of approximately 320 contiguous surface acres consisting of the North, South, East or West half of a section and being a legal subdivision of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in paragraph B. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

B. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A without notice and hearing:

1. Where the unorthodox size or shape of the tract is due to a variation in legal subdivision of the U. S. Public Land Surveys; or

2. Where application has been filed in due form and where the following facts exist and the following provisions are complied with:

a. The acreage assigned the non-standard unit lies wholly within a legal section.

b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

(2) a list of names and addresses of all operators outlined in paragraph (1), together with a stipulation that proper notice has been given said operators at the addresses given and no objection is received by the Commission from such operators within 20 days after the Commission receives such application.

d. The entire non-standard proration unit may reasonably be presumed to be productive of gas.

e. The length or width of the non-standard gas proration unit does not exceed 5280 feet.

C. The Secretary of the Commission shall have authority to grant an exception to Rule 7 A after notice and hearing, when the operator is unable to comply with the provisions of Rule 7 B.

GAS ALLOCATION

RULE 8. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Blanco Mesaverde Gas Pool.

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All nominations shall be filed on a form prescribed by the Commission.

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The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool shall be divided and allocated among the wells appearing on the proration schedule in the following manner: (1) a tentative allocation shall be made by dividing seventy-five per cent (75%) of the pool allocation among said wells in the proportion that the product of each well's calculated deliverability multiplied by the acreage comprising the standard proration unit or approved non-standard unit upon which the well is located bears to the sum of such products for all the wells on

the proration schedule; (2) the remaining twenty-five per cent (25%) of the pool allocation shall be divided among said wells in the proportion that the acreage comprising the proration unit of each well bears to the sum of the acreage comprising the proration unit of all wells appearing on the proration schedule. When the tentative allowable received by a well is in excess of its known producing ability, the well shall be classified as a marginal well and shall have its allowable limited to its producing ability. The sum of the difference between the tentative allowables and the limited allowables of all marginal wells on the proration schedule shall be reallocated to the non-marginal wells by application of the same formula. If such reallocation shall result in placing any other well within the marginal classification, the difference between the tentative allowable and the limited allowable of such marginal well shall be redistributed by application of the same formula until no well has received an allowable in excess of its known producing ability.

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b. The acreage assigned the non-standard unit is adjacent to or contiguous with the acreage containing said well.

c. The operator making application for such exception to Rule 7 A includes with such application:

(1) waivers from (a) all operators owning interests in the half section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit; and (b) all operators owning interests in acreage offsetting the non-standard proration unit; or

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All nominations shall be filed on a form prescribed by the Commission.

RULE 9. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for the gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month, together with an adjusted allowable computation for the second preceding month, said adjusted allowable shall be computed by comparing the actual allowable assigned with the actual production. In the event the allowable assigned is greater than the actual production, the allowable assigned the top allowable units shall be reduced proportionately; and in the event the allowable assigned is less than the production, then the allowable assigned the top allowable units shall be increased proportionately.

The Commission shall include in the proration schedule the gas wells in the Blanco Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the nominations together with any adjustment which the Commission deems advisable. The allocation to a pool shall be divided and allocated among the wells appearing on the proration schedule in the following manner: (1) a tentative allocation shall be made by dividing seventy-five per cent (75%) of the pool allocation among said wells in the proportion that the product of each well's calculated deliverability multiplied by the acreage comprising the standard proration unit or approved non-standard unit upon which the well is located bears to the sum of such products for all the wells on

the proration schedule; (2) the remaining twenty-five per cent (25%) of the pool allocation shall be divided among said wells in the proportion that the acreage comprising the proration unit of each well bears to the sum of the acreage comprising the proration unit of all wells appearing on the proration schedule. When the tentative allowable received by a well is in excess of its known producing ability, the well shall be classified as a marginal well and shall have its allowable limited to its producing ability. The sum of the difference between the tentative allowables and the limited allowables of all marginal wells on the proration schedule shall be reallocated to the non-marginal wells by application of the same formula. If such reallocation shall result in placing any other well within the marginal classification, the difference between the tentative allowable and the limited allowable of such marginal well shall be redistributed by application of the same formula until no well has received an allowable in excess of its known producing ability.

The calculated deliverability mentioned in the preceding paragraph shall be that deliverability as determined by a test taken in accordance with the provisions of Order No. R-333 or Order No. R-333A of the New Mexico Oil Conservation Commission or any amendments thereof. At the time of institution of proration, a connected well having no deliverability tests shall have its deliverability estimated as eighteen per cen (18%) of its three hour initial potential pending completion of its deliverability test. A temporary allowable shall be assigned such well using the estimated deliverability in the allocation formula until the deliverability test is taken, at which time those previous allowables granted the well by use of the estimated deliverability shall be revised by use of the actual calculated deliverability. In like manner the estimated deliverability for a well that is connected during the period between the end of one annual deliverability test and the beginning of the next annual deliverability test shall be determined and used for proration purposes pending the completion of the deliverability test for such a well. After the well is connected, the operator may elect to test the well in accordance with the procedure prescribed in Order No. R-333 or in Order No. R-333A for the annual deliverability test or to postpone such test until the next annual deliverability test period.

BALANCING OF PRODUCTION

RULE 10. Underproduction: The dates 7:00 A.M., March 1, and 7:00 A.M., September 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the first succeeding proration period in addition to the normal gas allowable for such succeeding period. That portion of such cumulative underproduction carried forward into the first succeeding proration period, which is not made up during said period shall be deducted from the total underproduction at the end of the period, resulting in only that volume of underproduction accrued during said period being carried forward as cumulative underproduction into the next succeeding proration period.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce. All underproduction accumulated to a well classified as marginal shall be added to the allocation for non-marginal wells and distributed thereto. While classified as a marginal well, the well shall accrue neither underproduction nor overproduction and its actual production shall be restricted only by the allowable it would have been assigned if it had been a non-marginal well.

RULE 11. Overproduction: An operator will be allowed to overproduce a well during a proration period and to accumulate and carry over such overproduction into the first succeeding proration period in an amount not in excess of the total allowable assignable to the well based on nominations for the first succeeding proration period. Should the allowable so calculated be less than the accumulated overproduction at the beginning of the first succeeding proration period, the well must be shut-in until the overproduction has been reduced to such allowable. Should the well's cumulative status not be brought in balance during the first succeeding proration period, that overproduction accumulated at the end of the first succeeding proration period must be brought in balance during the second succeeding proration period or the well must be shut-in at the end of the second succeeding proration period until its cumulative status is in balance.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 12. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 13. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 14. The monthly gas production from each gas proration unit shall be metered separately and the gas production therefrom shall be reported to the Commission by the operator so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas; provided, however, that gas used on the lease for consumption in lease houses, heaters, treaters, combustion engines and other similar lease equipment and that gas vented in testing or as required to maintain production shall not be charged against the well's allowable.

Copies of Form C-115, Monthly Production Report, submitted in compliance with Rule 14, shall be distributed by the operator as follows: Original to Oil Conservation Commission, Box 871, Santa Fe; two copies to Oil Conservation Commission, Box 697, Aztec, New Mexico.

Case 330

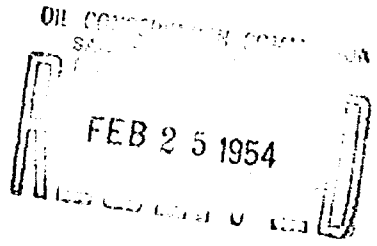
El Paso Natural Gas Company

TENTH FLOOR BASSETT TOWER

El Paso, Texas

H. F. STEEN
VICE PRESIDENT AND
GENERAL SUPERINTENDENT

February 24, 1954



New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Attention: Mr. R. R. Spurrier, Secretary

Dear Mr. Spurrier:

We are enclosing herewith two copies of a report setting out the volumes of gas taken from all of the Mesa Verde wells in the Blanco area in the San Juan Basin that were tied into the gathering system of the El Paso Natural Gas Company in 1953. If you need information other than that which is enclosed please let us hear from you.

Yours very truly,

H. F. Steen

HFS:rw
Encls.
cc: Mr. A. L. Hill

PHILLIPS EXHIBITS CASE 330, 330-A 6-21-54

Case No.

330; 330-A

Application, Transcript,
Small Exhibits, Etc.

RULES FOR BLANCO-MESAVERDE GAS POOL,
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO,
PROPOSED BY SOUTHERN UNION GAS COMPANY
IN CASE NO. 330-A

APPLICABILITY OF RULES

RULE 1. (a) The following special rules and regulations for the Blanco-Mesaverde Gas Pool (herein referred to as the "Pool") shall be limited in their application to the productive sands which are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde Formation.

(b) All additional lands located within one mile of any land in the Pool, as currently defined or as it may be hereafter extended, shall conform to these rules and regulations; and by order of this Commission the Pool may be redesignated from time to time so as to embrace other lands in the vicinity which are believed, on the basis of additional developments, to be capable of producing gas from the Mesaverde Formation, whether or not such other lands shall have been at one time included in another designated field or pool producing from such formation.

WELL SPACING AND ACREAGE REQUIREMENTS FOR DRILLING TRACTS

RULE 2. No well shall be drilled or completed or recompleted and no Notice of Intention to drill or Drilling Permit shall be approved, unless:

(a) Such well be located on a designated drilling unit of not less than three hundred twenty (320) acres of land, more or less, according to legal subdivision of the United States Land Surveys, in which unit all the interests are consolidated by pooling agreement or otherwise and on which no other well is completed, or approved for completion, in the Pool;

(b) Such drilling unit be in the shape of a rectangle, except for normal variations in legal subdivisions of the United States Land Surveys, the north half, south half, east half or west half of each section of land constituting a drilling unit; and

(c) Such well shall be located 330 feet from the center of either the northeast or southwest quarter of the section, subject to variation of 200 feet for topographic conditions, with further tolerance to be allowed by the Commission only in cases of extremely rough terrain where compliance would necessarily increase drilling costs.

PRORATION UNITS

RULE 3. (a) For the purpose of gas allocation in the Pool, a standard proration unit shall consist of between 315 and 325 contiguous surface acres substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys; provided, however, that a gas proration unit other than a legal half section may be formed after notice and hearing by the Commission, or as outlined in Paragraph (b) of this Rule. Any allocation

unit containing less than 315 acres or more than 325 acres shall be a non-standard unit. Any standard proration unit consisting of between 315 and 325 contiguous surface acres shall be considered as containing 320 acres for the purpose of gas allocation.

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 3 (a) without notice and hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with:

1. The nonstandard unit consists of less acreage than a standard proration unit.

2. The acreage assigned to the nonstandard unit lies wholly within a legal section and contains a well capable of producing gas into a gas transportation facility on the date of this order.

3. The operator notifies in writing the Commission and all operators in the adjoining 320 acre proration units of the operator's intention to apply for an exception to Rule 3 (a), and no objections are voiced to the Commission by any of said operators within a period of fifteen (15) days after the copies of such notice are mailed.

(c) Any provision herein to the contrary notwithstanding, the Commission may, and in proper cases will, on petition or on its own motion, by order entered after notice and hearing to the extent required by law, grant exceptions and permit drilling locations to become effective, thereby authorizing the drilling or completion of wells in the Pool not conforming to the foregoing requirements of these Rules if the Commission shall find that the property sought to be drilled would be deprived of an opportunity to produce gas from the Pool in the absence of such exception, or, irrespective of such finding, if the Commission shall find that by reason of all circumstances an exception is proper for the prevention of waste, or to prevent undue drainage between properties, or otherwise in the exercise by the Commission of its jurisdiction over the spacing of wells or its order powers conferred by law, express or implied.

(d) The pooling of properties or parts thereof shall be permitted, and if not agreed upon may be required in any case when and to the extent that the smallness or shape of a separately owned tract would, under the enforcement of the uniform spacing plan of proration units, otherwise deprive or tend to deprive the owner of such tract of the opportunity to recover his just and equitable share of the crude petroleum oil and natural gas in the Pool; provided, that the owner of any tract which is smaller than a standard proration unit shall not be deprived of the right to drill on and produce from such tract if same can be done without waste, but in such case the allowable production from such tract shall be reduced in accordance with the allocation formula hereinafter set out in Rule 5 (b).

GAS ALLOCATION

RULE 4. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its nominations of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months, from the Pool. The Commission shall consider the nominations of purchasers, actual production, and

such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste from the Pool within the ensuing proration period. Nominations shall be submitted on a form prescribed by the Commission.

RULE 5. (a) Whenever a gas purchaser, after filing its nominations for a proration period, shall find that its requirements for gas have increased from the amount nominated for any month during the proration period, such gas purchaser shall file with the Commission, not later than the 10th day of the preceding month, a supplemental nomination indicating its revised estimated requirements during such month. Supplemental nominations, if submitted, shall be on a form prescribed by the Commission. The Commission shall hold a public hearing between the 15th and 20th days of each month to determine the reasonable market demand for gas from the Pool for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. Included in the monthly proration schedule shall be a tabulation of allowable and production for the second preceding month together with an adjusted allowable computation for the second preceding month. Said adjusted allowable shall be computed by comparing the total allowable assigned to wells in the Pool with the total actual production of gas therefrom, and by reapplying, on the basis of such total actual production, the allocation formula set out in Rule 5 (b).

(b) The Commission shall include in the proration schedule all gas wells in the Pool delivering to a gas transportation facility or lease gathering system, and shall also include in the proration schedule any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the Pool each month shall be equal to the sum of the nominations, together with any adjustment which the Commission deems advisable. The allocation of gas to wells in the Pool remaining after subtracting the capacities of marginal wells shall be divided and allocated ratably among the nonmarginal wells as follows:

(1) 50% shall be allocated to each well in the ratio that (a) the acreage allocated to such well as its proration unit bears to (b) the total acreage allocated to all nonmarginal wells in the Pool entitled to receive an allowable;

(2) 50% shall be allocated to each well in the ratio that (a) the product of multiplying such well's deliverability in M.C.F. per day (determined as provided in the Commission's Order No. R-333-A) by the number of acres allocated to such well as its proration unit (as provided in Rule 3 above) bears to (b) the total of the products of similar multiplications of such factors for all nonmarginal wells in the Pool entitled to receive an allowable; and

(3) In no event, however, shall any well be given an allowable (or an adjusted allowable as provided for in Paragraph (a) of this Rule) of less than 350 M.C.F. per day or more than 2,500 M.C.F. per day.

BALANCING OF PRODUCTION

RULE 6. Underproduction: (a) The dates 7:00 A.M., February 1, and 7:00 A.M., August 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addi-

tion to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled. If, at the end of the first succeeding proration period, a greater amount of allowable remains unproduced than was carried forward as underproduction, the amount carried forward to the second succeeding period shall be the total underproduction less the amount carried forward to the first succeeding period.

(b) If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

RULE 7. Overproduction: (a) A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at the end of the first succeeding proration period, the well is still overproduced and has been overproduced throughout such proration period, it shall be shut in and its current monthly allowable charged against its overproduction at the end of such period until the well is in balance. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut in until it is in balance.

(b) The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut in upon a showing at public hearing after due notice that complete shut in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 8. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well.

RULE 9. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

REPORTING OF PRODUCTION

RULE 10. The monthly gas production from each gas well shall be metered separately and the gas production therefrom shall be submitted to the Commission on Form C-115 so as to reach the Commission on or before the twentieth day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced. The full production of gas from each well, other than gas used on the lease for consumption in lease houses, treaters, combustion engines and other similar lease equipment, shall be charged against the well's allowable.

CASING AND CEMENTING PROGRAM

RULE 11. (a) Surface Pipe: The surface pipe shall be set to a minimum depth of 100 feet, and where shallow potable water-bearing beds are present, the surface pipe shall be set to such shallow potable water-bearing beds and a sufficient amount of cement shall be used to circulate the cement behind the pipe to the bottom of the cellar. This surface casing shall stand cemented for at least 24 hours before dril-

ling plug or initiating tests. The surface casing shall be tested after drilling plug by bailing the hole dry. The hole shall remain dry for one hour to constitute satisfactory proof of a water shut-off. In lieu of the foregoing test the cement job may be tested by building up a pressure of 500 p.s.i., closing the valves and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory. This test shall be made both before and after drilling the plug. In this regard all fresh waters and waters of present or probable future value for domestic, commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by methods approved by the Commission. Special precaution shall be taken in drilling and abandoning wells to guard against any loss of artesian potable water from the strata in which it occurs and the contamination of artesian potable water by objectionable water, oil or gas. The Commission shall be notified at least 24 hours prior to the conducting of any test.

(b) Production String: The production string shall be set using a minimum of 100 sacks of cement and shall stand cemented not less than 36 hours before testing the casing. This test shall be made by building up a pressure of 1,000 p.s.i., closing the valves and allowing to stand thirty minutes. If the pressure does not drop more than 100 pounds during that period, the test shall be considered satisfactory.

(c) General: All cementing shall be done by the pump and plug method. Bailing tests may be used on all casing and cement tests, and drill stem tests may be used on cement tests in lieu of pressure tests. In making bailing test, the well shall be bailed dry and remain approximately dry for thirty minutes. If any string of casing fails while being tested by pressure or by bailing tests herein required, it shall be re-cemented and re-tested or an additional string of casing should be run and cemented. If an additional string is used, the same test shall be made as outlined for the original string. In submitting Form C-101, "Notice of Intention to Drill", the number of sacks of cement to be used on each string of casing shall be stated.

TUBING

RULE 12. Any completed well which produces any oil shall be tubed. This tubing shall be set as near the bottom of the hole as practicable, but in no case shall tubing perforations be more than 250 feet from the bottom. The bottom of the tubing shall be restricted to an opening of less than 1 inch or bullplugged in order to prevent the loss of pressure bombs or other measuring devices.

SPECIAL EQUIPMENT

RULE 13. Wellhead equipment for all wells shall be installed and maintained in first class condition, so that static bottom hole pressures and surface pressures may be obtained at any time by a duly authorized agent of the Commission. Valves shall be installed so that pressures may be readily obtained on the casing and also on the tubing, wherever tubing is installed. All connections subject to well pressure and all wellhead fittings shall be of first class material, rated at 2,000 p.s.i. working pressure and maintained in gas-tight condition. Bradenheads rated at 2,000 p.s.i. shall be installed on all production strings and Bradenhead connections maintained in gas-tight condition. There shall be at least one valve on each Bradenhead. Operators shall be responsible for maintaining all equipment in first class condition and shall repair or replace equipment where gas leakage occurs.

SAFETY REQUIREMENTS

RULE 14. Drilling boilers shall not be set closer than 200 feet to any well or tank battery. All electrical equipment shall be in first class condition and properly installed.

SHOOTING OF WELLS

RULE 15. Wells shall not be shot or chemically treated until the permission of the Commission is obtained. Each well shall be shot or treated in such manner as will not cause injury to the sand or result in water entering the oil or gas sand, and necessary precautions shall be taken to prevent injury to the casing. If shooting or chemical treatment results in irreparable injury to the well or to the oil or gas sand, the well shall be properly plugged and abandoned.

INITIAL POTENTIAL TEST

RULE 16. (a) The initial potential test in the Mesaverde Formation shall be made after a minimum shut in time of seven (7) days. The shut in pressure will be measured by the use of a dead-weight gauge. The open flow shall be determined by a pitot tube measurement after unrestricted flowing of the gas to the air for a period of three (3) hours; the flow nipple shall be at least eight (8) diameters long. The pitot tube shall be constructed of one-eighth (1/8) inch pipe (nominal diameter). Standard tables (Reid's) will be provided by the Commission.

(b) This test shall be reported on Commission Form C-122-B.

PROTECTION OF MINERAL DEPOSITS

RULE 17. Since the Menefee coal beds bear some gas and since these coal beds are of noncommercial value, Rule 20, Order Number 4 of the Commission dated August 12, 1935, shall not apply to this field.

GAS WASTAGE

RULE 18. Mesaverde gas shall not be flared since this is principally a gas reservoir and any well not connected to the lines of a gas purchaser shall be shut in until such market is obtained. Wells in this field shall be permitted to produce and market gas, as long as such can be done without waste, equitably between proration units for the field.

BRADENHEAD GAS

RULE 19. Bradenhead gas shall not be used in torches or expansively in engines or pumps, or be otherwise wasted. It may be used for lease and development purposes and for the development of nearby leases, except as prohibited above. Wells shall not be completed as Bradenhead gas wells unless special permission is obtained from the Commission.

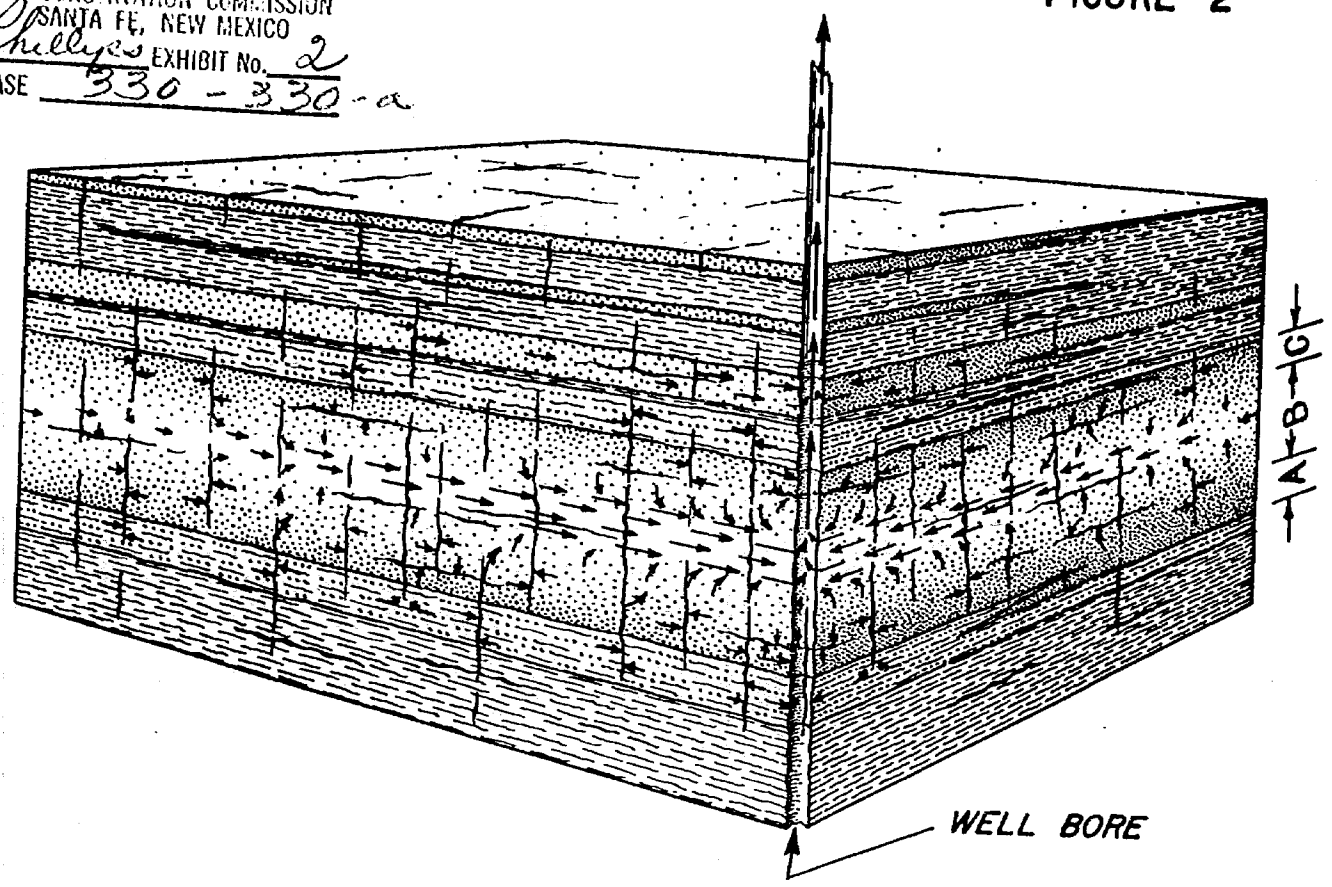
SPECIAL DEFINITIONS

RULE 20. The term "marginal well", as used in these Rules, shall mean a well not capable of producing its allowable, as calculated by means of the allocation formula set forth in Rule 5 (b) above. The term "nonmarginal well", as used in these Rules, shall mean any well, other than a marginal well, which is entitled to an allowable.

RULE 21. The term "gas purchaser", as used in these Rules, shall mean any taker of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be the responsibility of said taker to submit nominations as provided in Rules 4 and 5 above.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 2
CASE 330 - 330-a

FIGURE 2



SCHEMATIC DRAWING OF MESA VERDE SANDSTONES AND WELL BORE SHOWING FLOW OF GAS IN RESERVOIR WITH WELL PRODUCING.

LEGEND

- SANDSTONE BEDS WITH VERTICAL AND HORIZONTAL FRACTURES.
- SHALE BEDS WITH VERTICAL FRACTURES.
- SHALEY SAND OR SANDY SHALE BEDS WITH VERTICAL AND HORIZONTAL FRACTURES.
- FRACTURES EXPOSED IN WELL BORE.

→ ARROWS INDICATE DIRECTION OF GAS MOVEMENT.

A & C — SAND ZONES OF LOW PERMEABILITY.

B — SAND ZONES OF HIGH PERMEABILTIY.

← — GAS FLOW IN TO FRACTURES.

← — GAS FLOW OUT OF FRACTURES.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 3
CASE 1330

BLANCO - MESAVERDE GAS POOL

Summary of Data Available for Those Wells With Deliverability Tests

Deliverability Group	No. Wells	Avg. Initial Potential-Mcfd	Average Deliverability Mcfd	Average Production (1) Mcfd/Month
-100	16	1 026	63	2 177
100-199	40	2 012	155	4 605
200-299	27	2 242	255	6 890
300-399	19	2 737	349	10 133
400-499	20	2 815	444	9 910
500-599	24	3 555	548	14 147
600-699	15	3 534	654	16 413
700-799	16	4 218	742	15 394
800-899	18	4 139	850	20 156
900-999	29	4 190	948	21 693
1000-1099	20	5 235	1 045	26 302
1100-1199	7	4 517	1 160	26 144
1200-1299	9	5 203	1 240	30 618
1300-1399	7	5 355	1 350	38 059
1400-1499	13	4 922	1 453	37 615
1500-1599	2	6 736	1 542	23 159
1600-1699	4	6 012	1 635	38 307
1700-1799	8	6 602	1 746	42 050
1800-1899	6	6 310	1 865	47 041
1900-1999	6	5 925	1 952	45 641
2000-2099	7	6 704	2 049	45 774
2100-2199	3	4 735	2 158	45 849
2200-2299	2	7 927	2 244	64 989
2300-2399	1	6 800	2 379	40 041
2400-2499	2	6 880	2 469	35 780
2600-2699	3	8 017	2 653	59 378
2700-2799	1	7 921	2 768	64 773
2800-2899	1	683	2 860	73 295
2900-2999	3	6 403	2 931	64 553
3200-3299	1	8 520	3 255	54 109
3500-3599	1	5 452	3 577	48 580
3600-3699	1	7 480	3 690	59 294
5400-5499	1	6 000	5 409	75 739
5800-5899	1	11 000	5 803	97 750
6200-6299	1	14 140	6 237	167 355
7100-7199	1	3 640	7 161	30 650
8200-8299	1	36 285	8 223	149 842
9000-9099	1	23 000	9 015	168 529
9700-9799	2	12 164	9 728	87 340
15900-15999	1	20 300	15 909	146 292
17800-17899	1	19 411	17 840	57 834

(1) Production figure used for each individual well was the maximum production reported for the months of December, 1953, January, 1954, and February, 1954, with the February production being converted by the factor 31/28.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. ✓
CASE: 5280

CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

NO. 4223. LOGARITHMIC 5 BY 3 INCH CYCLES.

Production, Mcf/31 days

Deliverability, Mcfd

BLANCO-MESAVERDE POOL

Deliverability vs Production Data

(See attached summary for tabulation of data points)

o Data point considered in drawing curve

X Data point not considered in drawing curve

OIL CONSERVATION COMMISSION
BEFORE THE
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 6
CASE 320

BLANCO MESAVERDE - POOL

Comparison of Various Formulas

Description	Formula 0% A & 100% (AxD)	25% A & 75% (AxD)	50% A & 50% (AxD)	75% A & 25% (AxD)	100% A & 0% (AxD)
Acreage Factor (1)		186.1407	414.8525	644.6538	864.4391
Deliverability Factor (1)	0.5693261	0.4095009	0.2555516	0.1200091	
Limiting Deliverability Mcfd	-	315	557	733	864
Number of Wells					
Limited Wells (2)	-	181	267	312	342
Non-limited Wells (3)	572	391	305	260	230
Total	572	572	572	572	572
Percent of Total Wells					
Limited Wells	-	31.64	46.68	54.55	59.79
Non-limited Wells	100.00	68.36	53.32	45.45	40.21
Total	100.00	100.00	100.00	100.00	100.00
Allowable - Mcfd					
Limited Wells		28 876	66 939	96 520	121 179
Non-limited Wells	320 000	291 124	253 061	223 480	198 821
Total	320 000	320 000	320 000	320 000	320 000
Percent of Total Allowable					
Limited Wells		9.02	20.92	30.16	37.87
Non-limited Wells	100.00	90.98	79.08	69.84	62.13
Total	100.00	100.00	100.00	100.00	100.00

(1) Factors based on 320 acres per well.

(2) A limited well is one for which the allowable is equal to the deliverability.

(3) A non-limited well is one for which the allowable is less than the deliverability.

MHC:lp
6-18-54

#5

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

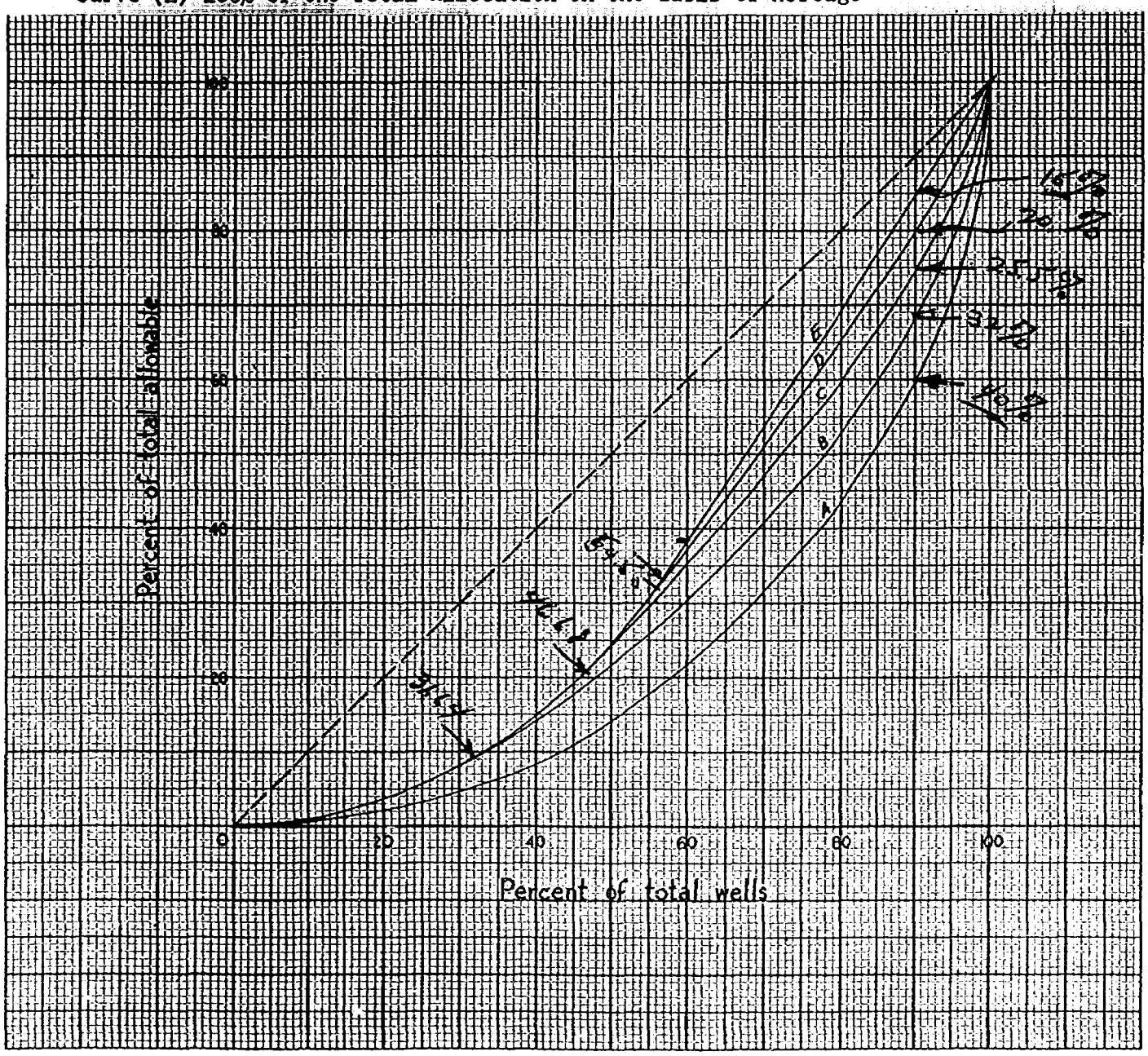
Curve (A) 100% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (B) 25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (C) 50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (D) 75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (E) 100% of the Total Allocation on the Basis of Acreage



BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M²cfd

100% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Deliverability Mcfd	Cumulative Deliverability Mcfd	Percent of Allowable
29	29	5.07	941	941	0.17
29	58	10.14	2 291	3 232	0.58
29	87	15.21	3 814	7 046	1.25
29	116	20.28	5 041	12 087	2.15
29	145	25.35	6 534	18 621	3.31
29	174	30.42	8 110	26 731	4.76
29	203	35.49	9 987	36 718	6.53
29	232	40.56	12 480	49 198	8.75
29	261	45.63	14 456	63 654	11.32
29	290	50.70	17 266	80 920	14.40
29	319	55.77	20 992	101 912	18.13
29	348	60.84	24 560	126 472	22.50
29	377	65.91	27 065	153 537	27.32
29	406	70.98	29 300	182 837	32.53
29	435	76.05	32 384	215 221	38.29
29	464	81.12	38 193	253 414	45.09
29	493	86.19	45 175	298 589	53.12
29	522	91.26	54 253	352 842	62.78
29	551	96.33	70 901	423 743	75.39
21	572	100.00	138 325	562 068	100.00
572			562 068		

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 452	36 183	11.31
29	232	40.56	10 508	46 691	14.59
29	261	45.63	11 320	58 011	18.13
29	290	50.70	12 469	70 480	22.03
29	319	55.77	13 996	84 476	26.40
29	348	60.84	15 455	99 931	31.23
29	377	65.91	16 479	116 410	36.38
29	406	70.98	17 395	133 805	41.81
29	435	76.05	18 658	152 463	47.65
29	464	81.12	21 034	173 497	54.22
29	493	86.19	23 898	197 395	61.69
29	522	91.26	27 617	225 012	70.32
29	551	96.33	34 430	259 442	81.08
21	572	100.00	60 553	319 995	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	16 401	80 055	25.02
29	319	55.77	17 396	97 451	30.45
29	348	60.84	18 309	115 760	36.17
29	377	65.91	18 944	134 704	42.09
29	406	70.98	19 517	154 221	48.19
29	435	76.05	20 309	174 530	54.54
29	464	81.12	21 794	196 324	61.35
29	493	86.19	23 575	219 899	68.72
29	522	91.26	25 894	245 793	76.81
29	551	96.33	30 151	275 944	86.23
21	572	100.00	44 063	320 007	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	17 266	80 920	25.29
29	319	55.77	20 759	101 679	31.77
29	348	60.84	21 641	123 320	38.54
29	377	65.91	21 945	145 265	45.39
29	406	70.98	22 213	167 478	52.33
29	435	76.05	22 583	190 061	59.39
29	464	81.12	23 281	213 342	66.67
29	493	86.19	24 116	237 458	74.20
29	522	91.26	25 209	262 667	82.08
29	551	96.33	27 207	289 874	90.58
21	572	100.00	30 141	320 015	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

100% of the Total Allocation on the Basis of Acreage

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.36
29	203	35.49	9 987	36 718	11.48
29	232	40.56	12 480	49 198	15.38
29	261	45.63	14 456	63 654	19.90
29	290	50.70	17 266	80 920	25.30
29	319	55.77	20 992	101 912	31.86
29	348	60.84	24 451	126 363	39.50
29	377	65.91	25 056	151 419	47.33
29	406	70.98	25 056	176 475	55.17
29	435	76.05	25 056	201 531	63.00
29	464	81.12	25 056	226 587	70.83
29	493	86.19	25 056	251 643	78.66
29	522	91.26	25 056	276 699	86.50
29	551	96.33	25 056	301 755	94.33
21	572	100.00	18 144	319 899	100.00
572					

MHC:lp
6-16-54

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 8
CASE 930

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

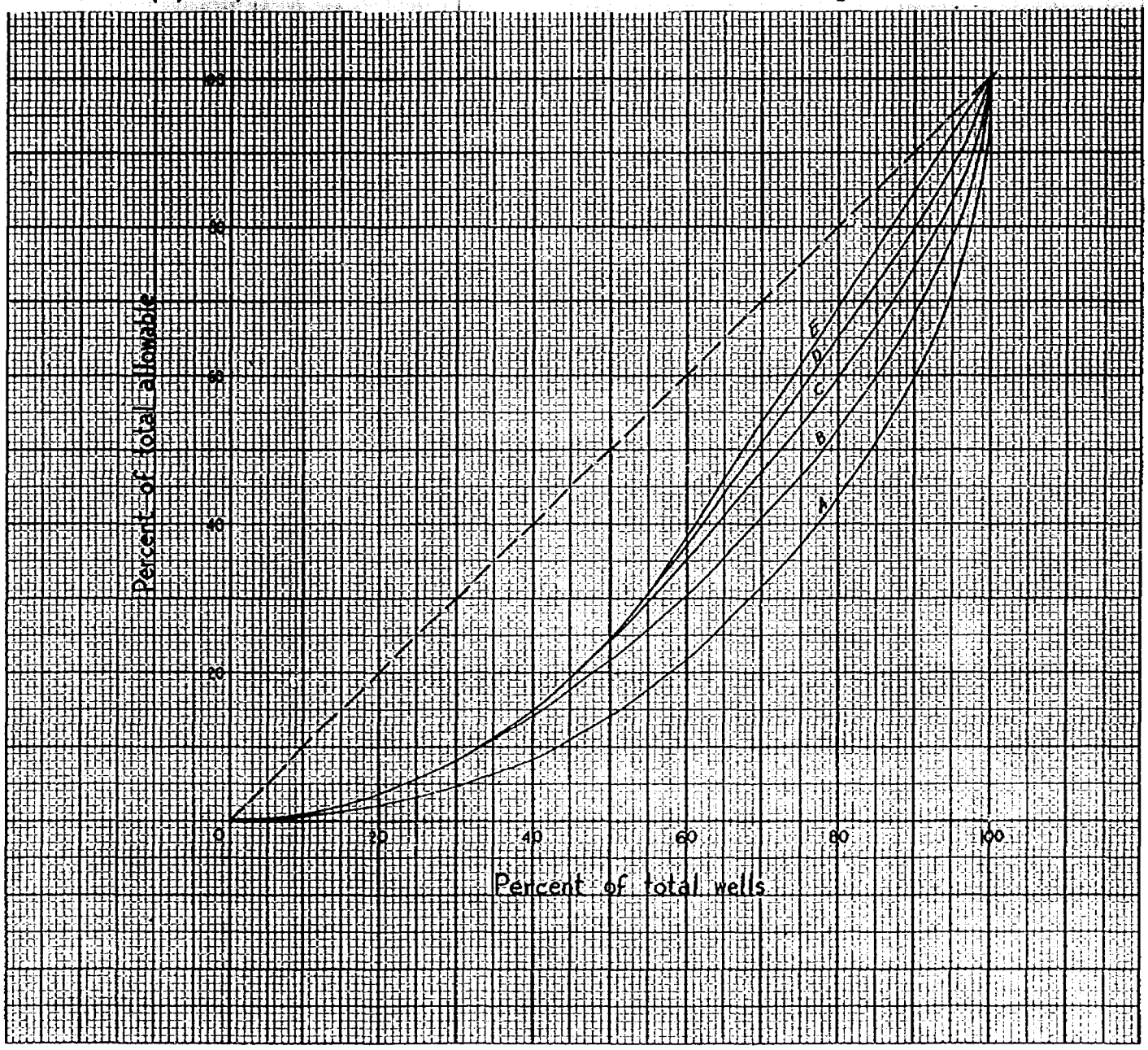
Curve (A) 100% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (B) 25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (C) 50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (D) 75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability)

Curve (E) 100% of the Total Allocation on the Basis of Acreage



BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

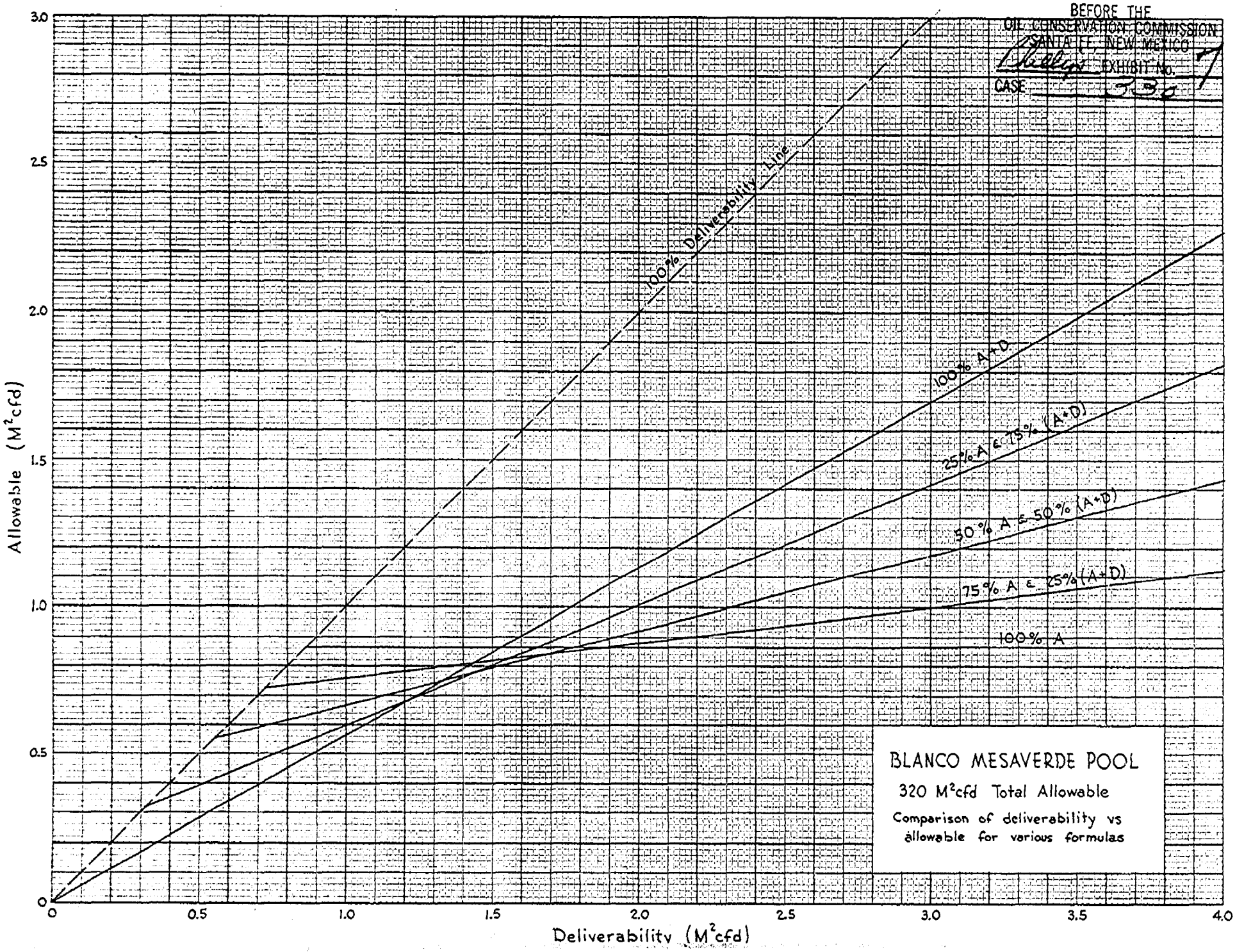
100% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Deliverability Mcfd	Cumulative Deliverability Mcfd	Percent of Allowable
29	29	5.07	941	941	0.17
29	58	10.14	2 291	3 232	0.58
29	87	15.21	3 814	7 046	1.25
29	116	20.28	5 041	12 087	2.15
29	145	25.35	6 534	18 621	3.31
29	174	30.42	8 110	26 731	4.76
29	203	35.49	9 987	36 718	6.53
29	232	40.56	12 480	49 198	8.75
29	261	45.63	14 456	63 654	11.32
29	290	50.70	17 266	80 920	14.40
29	319	55.77	20 992	101 912	18.13
29	348	60.84	24 560	126 472	22.50
29	377	65.91	27 065	153 537	27.32
29	406	70.98	29 300	182 837	32.53
29	435	76.05	32 384	215 221	38.29
29	464	81.12	38 193	253 414	45.09
29	493	86.19	45 175	298 589	53.12
29	522	91.26	54 253	352 842	62.78
29	551	96.33	70 901	423 743	75.39
21	572	100.00	138 325	562 068	100.00
572			562 068		

MHC:lp
6-16-54

KEUFFEL & ESSER CO. N.Y.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
EXHIBIT No. 7
CASE 532



BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

25% of the Total Allocation on the Basis of Acreage
and
75% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 452	36 183	11.31
29	232	40.56	10 508	46 691	14.59
29	261	45.63	11 320	58 011	18.13
29	290	50.70	12 469	70 480	22.03
29	319	55.77	13 996	84 476	26.40
29	348	60.84	15 455	99 931	31.23
29	377	65.91	16 479	116 410	36.38
29	406	70.98	17 395	133 805	41.81
29	435	76.05	18 658	152 463	47.65
29	464	81.12	21 034	173 497	54.22
29	493	86.19	23 898	197 395	61.69
29	522	91.26	27 617	225 012	70.32
29	551	96.33	34 430	259 442	81.08
21	572	100.00	60 553	319 995	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

50% of the Total Allocation on the Basis of Acreage
and
50% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	16 401	80 055	25.02
29	319	55.77	17 396	97 451	30.45
29	348	60.84	18 309	115 760	36.17
29	377	65.91	18 944	134 704	42.09
29	406	70.98	19 517	154 221	48.19
29	435	76.05	20 309	174 530	54.54
29	464	81.12	21 794	196 324	61.35
29	493	86.19	23 575	219 899	68.72
29	522	91.26	25 894	245 793	76.81
29	551	96.33	30 151	275 944	86.23
21	572	100.00	44 063	320 007	100.00
572					

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

75% of the Total Allocation on the Basis of Acreage
and
25% of the Total Allocation on the Basis of (Acreage x Deliverability).

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.35
29	203	35.49	9 987	36 718	11.47
29	232	40.56	12 480	49 198	15.37
29	261	45.63	14 456	63 654	19.89
29	290	50.70	17 266	80 920	25.29
29	319	55.77	20 759	101 679	31.77
29	348	60.84	21 641	123 320	38.54
29	377	65.91	21 945	145 265	45.39
29	406	70.98	22 213	167 478	52.33
29	435	76.05	22 583	190 061	59.39
29	464	81.12	23 281	213 342	66.67
29	493	86.19	24 116	237 458	74.20
29	522	91.26	25 209	262 667	82.08
29	551	96.33	27 207	289 874	90.58
21	572	100.00	30 141	320 015	100.00

572

MHC:lp
6-16-54

BLANCO - MESAVERDE POOL

Distribution of Allowable - 320 M^2cfd

100% of the Total Allocation on the Basis of Acreage

No. Wells	Cumulative Wells	Percent of Total	Total Allowable Mcfd	Cumulative Allowable Mcfd	Percent of Allowable
29	29	5.07	941	941	0.29
29	58	10.14	2 291	3 232	1.01
29	87	15.21	3 814	7 046	2.20
29	116	20.28	5 041	12 087	3.78
29	145	25.35	6 534	18 621	5.82
29	174	30.42	8 110	26 731	8.36
29	203	35.49	9 987	36 718	11.48
29	232	40.56	12 480	49 198	15.38
29	261	45.63	14 456	63 654	19.90
29	290	50.70	17 266	80 920	25.30
29	319	55.77	20 992	101 912	31.86
29	348	60.84	24 451	126 363	39.50
29	377	65.91	25 056	151 419	47.33
29	406	70.98	25 056	176 475	55.17
29	435	76.05	25 056	201 531	63.00
29	464	81.12	25 056	226 587	70.83
29	493	86.19	25 056	251 643	78.66
29	522	91.26	25 056	276 699	86.50
29	551	96.33	25 056	301 755	94.33
21	572	100.00	18 144	319 899	100.00
572					

MHC:lp
6-16-54

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3,000

BLANCO MESAVERDE - POOL

Comparison of Various Formulas

Description	Formula 0% A & 100% (AxD)	25% A & 75% (AxD)	50% A & 50% (AxD)	75% A & 25% (AxD)	100% A & 0% (AxD)
		mcf/day/well			
Acreage Factor (1)		186.1407	414.8525	644.6538	864.4391
Deliverability Factor (1)	0.5693261	0.4095009	0.2555516	0.1200091	
Limiting Deliverability Mcfd	-	315	557	733	864
Number of Wells					
Limited Wells (2)	-	181	267	312	342
Non-limited Wells (3)	572	391	305	260	230
Total	572	572	572	572	572
Percent of Total Wells					
Limited Wells	-	31.64	46.68	54.55	59.79
Non-limited Wells	100.00	68.36	53.32	45.45	40.21
Total	100.00	100.00	100.00	100.00	100.00
Allowable - Mcfd					
Limited Wells		28 876	66 939	96 520	121 179
Non-limited Wells	320 000	291 124	253 061	223 480	198 821
Total	320 000	320 000	320 000	320 000	320 000
Percent of Total Allowable					
Limited Wells		9.02	20.92	30.16	37.87
Non-limited Wells	100.00	90.98	79.08	69.84	62.13
Total	100.00	100.00	100.00	100.00	100.00

(1) Factors based on 320 acres per well.

(2) A limited well is one for which the allowable is equal to the deliverability.

(3) A non-limited well is one for which the allowable is less than the deliverability.

MHC:lp
6-18-54

17840
5

5

What's bad about that?

How many wells are marginal in SE?

80%? Oil- 777.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 6
CASE 330

BLANCO MESAVERDE - POOL

Comparison of Various Formulas

Description	Formula 0% A & 100% (AxD)	25% A & 75% (AxD)	50% A & 50% (AxD)	75% A & 25% (AxD)	100% A & 0% (AxD)
Acreage Factor (1)		186.1407	414.8525	644.6538	864.4391
Deliverability Factor (1)	0.5693261	0.4095009	0.2555516	0.1200091	
Limiting Deliverability Mcfd	-	315	557	733	864
Number of Wells					
Limited Wells (2)	-	181	267	312	342
Non-limited Wells (3)	572	391	305	260	230
Total	572	572	572	572	572
Percent of Total Wells					
Limited Wells	-	31.64	46.68	54.55	59.79
Non-limited Wells	100.00	68.36	53.32	45.45	40.21
Total	100.00	100.00	100.00	100.00	100.00
Allowable - Mcfd					
Limited Wells		28 876	66 939	96 520	121 179
Non-limited Wells	320 000	291 124	253 061	223 480	198 821
Total	320 000	320 000	320 000	320 000	320 000
Percent of Total Allowable					
Limited Wells		9.02	20.92	30.16	37.87
Non-limited Wells	100.00	90.98	79.08	69.84	62.13
Total	100.00	100.00	100.00	100.00	100.00

(1) Factors based on 320 acres per well.

(2) A limited well is one for which the allowable is equal to the deliverability.

(3) A non-limited well is one for which the allowable is less than the deliverability.

MHC:lp
6-18-54

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
Phillips EXHIBIT No. 3
CASE 330

BLANCO - MESAVERDE GAS POOL

Summary of Data Available for Those Wells With Deliverability Tests

Deliverability Group	No. Wells	Avg. Initial Potential-Mcfd	Average Deliverability Mcfd	Average Production (1) Mcf/Month
-100	16	1 026	63	2 177
100-199	40	2 012	155	4 605
200-299	27	2 242	255	6 890
300-399	19	2 737	349	10 133
400-499	20	2 815	444	9 910
500-599	24	3 555	548	14 147
600-699	15	3 534	654	16 413
700-799	16	4 218	742	15 394
800-899	18	4 139	850	20 156
900-999	29	4 190	948	21 693
1000-1099	20	5 235	1 045	26 302
1100-1199	7	4 517	1 160	26 144
1200-1299	9	5 203	1 240	30 618
1300-1399	7	5 355	1 350	38 059
1400-1499	13	4 922	1 453	37 615
1500-1599	2	6 736	1 542	23 159
1600-1699	4	6 012	1 635	38 307
1700-1799	8	6 602	1 746	42 050
1800-1899	6	6 310	1 865	47 041
1900-1999	6	5 925	1 952	45 641
2000-2099	7	6 704	2 049	45 774
2100-2199	3	4 735	2 158	45 849
2200-2299	2	7 927	2 244	64 989
2300-2399	1	6 800	2 379	40 041
2400-2499	2	6 880	2 469	35 780
2600-2699	3	8 017	2 653	59 378
2700-2799	1	7 921	2 768	64 773
2800-2899	1	683	2 860	73 295
2900-2999	3	6 403	2 931	64 553
3200-3299	1	8 520	3 255	54 109
3500-3599	1	5 452	3 577	48 580
3600-3699	1	7 480	3 690	59 294
5400-5499	1	6 000	5 409	75 739
5800-5899	1	11 000	5 803	97 750
6200-6299	1	14 140	6 237	167 355
7100-7199	1	3 640	7 161	30 650
8200-8299	1	36 285	8 223	149 842
9000-9099	1	23 000	9 015	168 529
9700-9799	2	12 164	9 728	87 340
15900-15999	1	20 300	15 909	146 292
17800-17899	1	19 411	17 840	57 834

(1) Production figure used for each individual well was the maximum production reported for the months of December, 1953, January, 1954, and February, 1954, with the February production being converted by the factor 31/28.

Texas Gas Proration Formulas

District 1

Imogene, East		A		
Jake Hammon	2/3	AxBHP	1/3	W
Loma Alta Wilcox "B"	1/2	A	1/2	W

District 2

Albrecht	1/2	A	1/2	W
Arneckeville	2/3	A	1/3	W
Boyce		A		
Caesar, South		A		
Cologne, West	2/3	AxRP	1/3	W
Cordele, West	1/2	A	1/2	W
Coy City		AxBHP		
George West, West		AxBHP		
Goree Slick Wilcox	2/3	A	1/3	W
Gottschalt		AxBHP		
Harris (Wilcox)	2/3	A	1/3	BHP
Henze	2/3	GAF	1/3	W
Jennie Bell	2/3	A	1/3	W
Karons, South	2/3	A	1/3	W
Kittie West	2/3	A	1/3	BHP
Long Mott, South	2/3	AxBHP	1/3	W
Mary Ellen O'Connor		AxBHP		
McFaddin, North	1/2	A	¼ Pt	¼ W
Oakville (Wilcox)	2/3	A	1/3	BHP
Placedo (5300 zone)	1/2	AxBHP	1/2	W
Plummer - Wilcox		AxBHP		
Refugio - Hynes		AxBHP		
Sheriff, East		AxBHP		
Slick - Wilcox		A		
Welder Ranch (5300 zone)		AxBHP		

District 3

Ace, First Wilcox	2/3	A	1/3	W
Alief	3/4	AxRP	1/4	Pt
Alvin City		AxBHP		
Amelia	3/4	A	1/4	W
Bay City, East		AxBHP		
Beaumont, West	2/3	AxBHP	1/3	W
Blue Lake	2/3	AxRP	1/3	Pt
Castillo	2/3	A	1/3	W
Cold Springs	2/3	A	1/3	W
Deckers Prairie		AxBHP		
Echo		AxBHP		
Evergreen	1/2	A	1/2	W
Fairbanks, Southwest	2/3	A	1/3	W
Fulshear	1/2	A	1/2	W
Hampton, South	2/3	AxBHP	1/3	W
Hamshire, West		A		
Jackson Pasture, East	1/2	AxBHP	1/2	W
Lick Branch	2/3	A	1/3	W
Louise, North	2/3	AxRP	1/3	Pt.
Louise, West		AxBHP		
Madisonville		AxBHP		
McCoy	2/3	AxRP	1/3	Pt
Needville	3/4	A	1/4	W
Niels Carlsen		AxBHP		
Nona Mills		AxBHP		
Old Ocean		AxBHP		
Pelican	2/3	A	1/3	W
Prasifka		AxBHP		
Spanish Camp		AxRP		
Spindletop, North	3/4	A	1/4	W
Spurger		AxBHP		
Sublime	2/3	A	1/3	W
Sugar Valley		NAF		
Village Mills, East		AxBHP		

District 4

Brayton		A		
Callaboose	2/3	AxRP	1/3	W
Cinco de Mayo		A		
Goose Island	2/3	A	1/3	W
Hagist Ranch		A		
Harvey		AxBHP		
La Blanca		AxBHP		
Lacy		AxBHP		
La Sal Vieja		AxBHP		
Luby	2/3	A	1/3	BHP
Minnie Bock, North		AxRP		
Murdock Pass	2/3	A	1/3	W
Mustang Island		AxBHP		
Odem	2/3	A	1/3	W
Red Fish Bay, North	3/4	A	1/4	W
Riverside	1/2	AxRP	¼W	¼D
Rooke	2/3	AxBHP	1/3	D
Sinton Shallow, West	1/2	A	1/2	W
Starr County, Northeast	2/3	AxBHP	1/3	W
Stedman Island	3/4	A	1/4	W
Sun		NAF		
Tobasco	2/3	A	1/3	W
Taft, West		A		
Tiger		AxRP		
Triple "A" Frio		A		
Weslaco, South		AxBHP		
White Point, East	2/3	A	1/3	W

District 5

Oakwood		A		
Teague		AxBHP		
Teague, West	2/3	AxBHP	1/3	W
Tri-Cities	1/2	A	1/2	Pt

District 6

Bethany	2/3	A	1/3	W
Bobby Joe		AxBHP		
Carthage		AxBHP		
Elysian Fields		AxBHP		
Hallsville, South	2/3	AxRP	1/3	W
Huxley		AxBHP		
Jacksonville		AxRP		
Joaquin	2/3	A	1/3	W
Lansing, North		AxBHP		
Minden		AxBHP		
Navarro Crossing		A		
Prairie Lake	2/3	A	1/3	W
Red Springs		AxBHP		
Trawick		AxBHP		
Tyler, South		AxBHP		
Waskom		AxBHP		

District 6 (Continued)

Willow Springs	AxBHP
Winnsboro	AxBHP
Woodlawn	AxBHP
Yantis	AxBHP

District 7-B

Lazy Bend	AxD
Nimrod	3/4 A 1/4 W
Sipe Springs	1/2 AxRP 1/2 D
Trammel	AxBHP

District 7-C

Benedum	A
Eden	1/2 AxRP 1/2 D

District 8

Weiner	AxBHP

District 9

Boonsville	AxBHP
Cottondale	AxBHP

District 10

Panhandle, East	1/2 A 1/2 Pt
Panhandle, West	2/3 AxRP 1/3 Pt
Texas Hugoton	AxD

Key to Symbols

A	-	Acres
D	-	Deliverability
W	-	Well
Pt	-	Potential
RP	-	Rock Pressure
BHP	-	Bottom Hole Pressure
GAF	-	Gross Acre-Feet
NAF	-	Net Acre-Feet

Acreage and Well Formulae:

	A		13
1/2	A	1/2 W	6
2/3	A	1/3 W	19
3/4	A	1/4 W	6
			44

Bottom Hole Pressure Formulae:

	AxBHP		45
1/2	AxBHP	1/2 W	2
2/3	AxBHP	1/3 W	6
1/3	BHP	2/3 A	4
			57

Rock Pressure Formulae:

	AxRP		4
2/3	AxRP	1/3 W	3
			7

Potential Formulae:

1/2	Pt.	1/2 A	2
1/4	Pt.	3/4 AxRP	1
1/3	Pt.	2/3 AxRP	4
1/4	Pt.	1/2 A 1/4 W	1
			8

Deliverability Formulae:

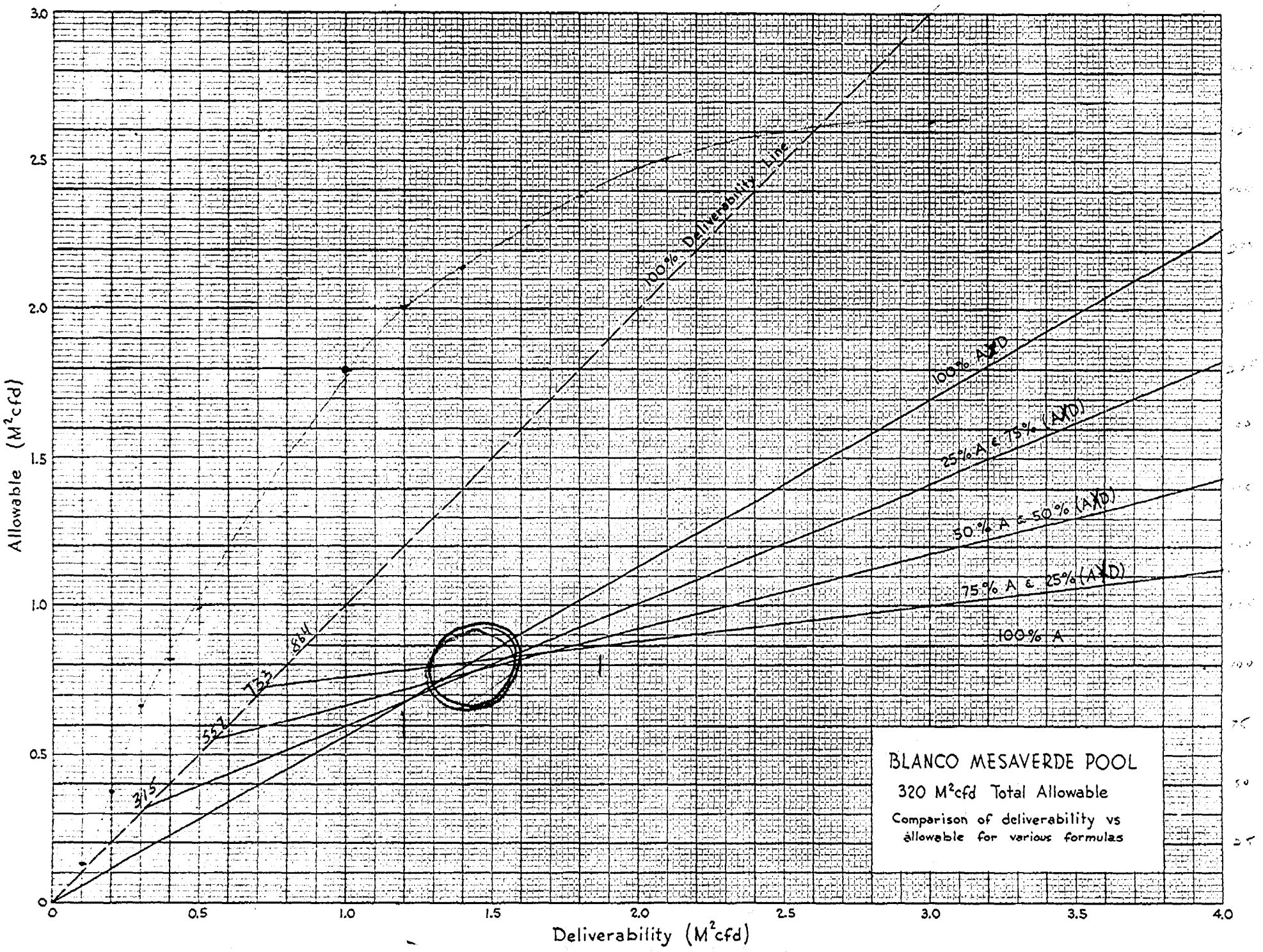
	AxD		2
1/2	D	1/2 AxRP	2
1/3	D	2/3 AxBHP	1
1/4	D	1/2 AxRP 1/4W	1
			6

Acre-Foot Formulae:

	NAF		2
2/3	GAF	1/3 W	1
			3

Total 125

KEUFFEL & ESSER CO. N. Y.



Case No.

330, 330-A

Application, Transcript,
Small Exhibits, Etc.

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

COPY

December 17, 1954

Stanolind Oil and Gas Company
Box 1410
FORT WORTH, TEXAS

Attention: Mr. Bedford or Mr. Hiltz

Gentlemen:

We attach a copy of Oil Conservation Commission Order R-128-C issued under date of December 16, 1954, in Cases 330 and 330-A.

Very truly yours,

W. B. Macey
Secretary - Director

WBM:nr

Encl.

F

NEW MEXICO CLIPPING BUREAU
Albuquerque, N. M.

APR 9 1954
Albuquerque Journal

Public Service Cuts Income Tax Nearly $1 Millio

The Public Service Co. of Ne Mexico told its stockhold Thursday that it has reduced i federal income tax payments b nearly $1,000,000 during the pa two years by consolidating tax report with that of Pubc Development Inc.

Pubco is a wholly-owned su sidiary of the electric fir created for the purpose of see ing and developing oil and g reserves in New Mexico an other states.

In annual reports on the o eration of both firms, stockhold ers were told that Pubco had a net loss of approximately $220,- 000 while the electric and water distribution firm had a net in- come of $1,153,890.

How Loss Is Computed

The loss for Pubco was com- puted—the report explained— after "deducting the costs of drilling dry holes and the write- off of the investment in one well which was abandoned because of mechanical failure." These costs, the report said, totaled some $316,000.

"Because of the extraordinary charges and other circumstances, Pubco during 1953 was not sub- ject to any liability for federal or state income taxes," the re- port said.

The report then explained that as a result of filing the consolidated income tax returns, "federal income taxes payable by the parent were reduced sub- stantially as compared with the amounts that would have been payable on the basis of separate returns."

Contributions Made

Public Service — the report added—"has followed the policy of making capital contributions to Pubco equivalent roughly to the amount of such tax savings . . . The tax savings are due entirely to Pubco's losses and deductions which would have been available to Pubco as a carry-over to future tax years if separate returns had been filed by each company. During 1953 Public Service made cash contributions to the capital of Pubco amounting to $231,365, which was the net tax saving for the year 1952. For the tax year 1953 the corresponding tax saving is expected to be approxi- mately $702,613 and it is ex- pected that capital contributions totaling approximately that amount will be received by Pubco during 1954."

Pubco's president—D. W. Reeves—told his stockholders that as of Dec. 31 Pubco held oil and gas leases, including contract rights and options to acquire such leases, on a total of approximately 65,917 gross acres of land (subject to royalty

IDAY IS FAMILY

ature and a best buy for
ear and handsome good
. For first-step comfort.
leather with wheat col-
mesh with brown leath-

interests of lessors and in certain cases to overriding royalty interests.)

The report listed 29,616 acres in New Mexico with 6205 listed as developed and producing; 3272 as developed and awaiting pipe line; 5613 as proven but undeveloped; 160 as overriding leaseholds; and 14,366 as wildcat. The firm has leases on 27,679 acres of wildcat land in Utah; and on 40 producing and 4233 wildcat acres in Colorado. It also has leases on 3229 acres of wildcat land in Wyoming and on 40 producing and 1080 wildcat acres in Nebraska.

Total Reserves Estimated

The company estimated that as of March 20, 1954, its net total recoverable oil and gas reserves were in excess of 300 billion cubic feet of natural gas and one million barrels of oil.

The Pubco report mentioned the fact that the Oil Conservation Commission of New Mexico is considering pro-rationing of natural gas but said that it believes the "effect on earnings due to proration would not be serious."

Pubco said that it believes that the interests of stockholders will be best served by a "continuance of the present policy of utilizing available funds for the acquisition of additional leased acreage and the development of proven acreage, together with a certain amount of wildcat drilling . . ."

3779 Customers Gained

In his report, Arthur Prager, Public Service Co. president, pointed out that the electric branch of the firm gained 3779 customers in 1953 with Albuquerque accounting for 94 per cent of the gain. The firm operates in Albuquerque, Santa Fe, Las Vegas, Deming and Belen.

The report showed that net income amounted to $1,153,890 or 5.7 per cent more than in 1952. Operating revenues totaled $8,348,521—up 11 per cent and tax payments totaled $1,716,286, up 13.7 per cent from 1952.

The report said that total electric power requirements increased 11.5 per cent during 1953 with the total cost of providing the power going down $164,000 or 8.2. The report credited the lower costs to "new and modern generating capacity at Person station" and other factors but said that "electric department expenses other than power costs continued to increase along with the growth in customers and revenues and enlarged plant facilities."

Construction Expenses

The report said that Public Service Co. spent $7,219,000 in construction costs in 1953—including some $2,515,000 of equipment contracts payable during 1954. It estimated that 1954 expenditures for construction will be about $7,145,000 but pointed out that his total also includes the $2,515,000 payment for equipment contracts. Preliminary estimates indicate construction costs in 1955 will be about $2,400,000.

The report pointed out that it was granted an increase in water and electric rates effective early this year and said

"earnings for 1954 will be ably affected." " udget studies indicate a stantial increase over 1953 in amount of net income which ll be available for the pay- ent of dividends on the pre- rred and common stock."

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Commission Seeks Mode Of Gas Ration

The State Oil Conservation Commission said today it hopes to arrive soon at the fairest possible method of allotting production of natural gas in the San Juan Basin.

The commission, completing a four-day hearing, took under advisement motions to start prorationing natural gas production in the basin for the first time.

There was no indication as to what the commission's staff recommendations would be, nor how the commission itself ultimately would determine a formula.

"Actually, we've done a lot of work already and the hearing was merely the culmination of six months study," said Richard Spurrier, member and executive director of the commission. "It should not be too long before we are ready with an order, though, if we are to get prorationing established, as we want to do.

"The testimony indicated there is not a ratable take in the basin and that to obtain a ratable take we shall have to do it with prorationing."

To explain what he meant by 'ratable take', Spurrier used two adjoining wells in the same pool as examples. If for some reason well No. 1 was producing much more than well No. 2, ratable take would not exist; but all things being equal, the take should be the same.

The idea would be the same as if two hoses were siphoning from the same tub of water and one developed a kink or some kind of obstruction which did not permit it to take out as much as the other. A ratable take would not be present.

Spurrier said no real opposition to prorationing itself developed at the hearing. The testimony boiled down generally to two schools of thought:

1. The formula should allow high production to wells capable of high delivery. El Paso Natural Gas and Pubco Development Co. were principal advocates of this theory.

2. The formula should give more credit to acreage, hold down production allotted the "high deliverability" wells to something like a top of 2½ million cubic feet a day, and thus spread production around to all wells. Phillips Petroleum, Southern Union Gas Co. and nearly all the others liked this formula, Spurrier said.

Experience has shown that high production by some wells has permitted them to pay for themselves to 2½ million cubic feet a day the in five months. If they were held wells' pay-out period would be extended to about a year and a half. The pay-out period for oil wells in southeastern New Mexico generally is regarded as from 1½ to 10 years.

May 19, 1955

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Santa Fe, New Mexico

* * * * *

TRANSCRIPT OF PROCEEDINGS

CASE NO. 330, 330a

Regular Hearing

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
Santa Fe, New Mexico
May 19, 1954

IN THE MATTER OF:	
(From April 15) Stanolind Oil and Gas Company's application for the amendment of Order R-110 relating to Blanco-Mesaverde Pool, San Juan and Rio Arriba Counties, New Mexico.	Cases No's. 330 330 A Consolidated
Application of the Commission on its own motion to consider an order promulgating rules and regulations for the Blanco-Mesaverde Gas Pool, San Juan and Rio Arriba Counties; matters to be considered include gas pool delineation and definition, gas proration, gas well spacing, gas proration units, and related matters.	

BEFORE THE FULL COMMISSION

TRANSCRIPT OF PROCEEDINGS

MR. SPURRIER: The meeting will come to order, please. The next case on the docket is Case 330. Mr. Barnes.

MR. BARNES: Mr. Spurrier, before the case 330 is taken up, I have a letter here and an outline of the work that was done by the San Juan Basin operators Committee in regard to the study of proration of gas in the Mesaverde reservoir in the San Juan Basin in Northwestern New Mexico. I would like to present this to the Commission and to read this letter into the record, if I have your permission.

MR. SPURRIER: You may.

MR. SELINGER: Doesn't that apply to both Case 330 and 330-A?

MR. BARNES: I think it would apply to both Cases.

MR. SPURRIER: We have no objection to consolidating those Cases.

MR. TOWNSEND: We would like to have the Commission do so and have the record in Case 330 and 330 A, Consolidated.

MR. SPURRIER: Is there objection, without objection we will consolidate the cases.

MR. BARNES: This letter is dated May 18, 1954, and addressed to Oil Conservation Commission, Santa Fe, New Mexico, "Gentlemen: Enclosed herewith is an outline of the work accomplished by the Engineering Subcommittee of the San Juan Basin Operators Committee in regard to gas proration in the Mesaverde formation of the San Juan Basin of northwestern New Mexico. An executive session of the San Juan Basin Operators Committee, as a whole, was held May 18, 1954. A report of the sub-committee was reviewed, amended and adopted by this committee and is enclosed with this letter.

At the meeting today of the San Juan Basin Operators Committee, there appeared to be a desire of the majority to compromise on a proration formula of 75% deliverability times acreage plus 25% acreage. However, there was a minority present who was not in agreement with this formula.

The San Juan Basin Operators Committee has not taken any stand for or against the proration of natural gas in the Mesaverde reservoir in the San Juan Basin. Any such position will have to be taken by the individual members and any testimony for or against proration would also have to be submitted by the individual members.

Because of the scope of this study, the operators committee hereby recommends that all proration hearings be heard on a separate day and not as a part of the monthly hearings, in order that there will be no interruption or interference with the testimony presented and this date be set not sooner than 30 days from today. This will

also allow more adequate time to combine data, and provide the members an opportunity to prepare additional and more complete data to present to the Commission.

We sincerely hope that the enclosed data will be of assistance to the Commission to consider the problems of proration."

MR. SPURRIER: Does anyone have testimony to present in either Case 330 or 330 A?

MR. TOWNSEND: Mr. Jim Townsend for Stanolind. Stanolind in Case 330 offered testimony some year and a half ago, if the record in Case 330 is made a part of 330 A, that testimony will speak for itself, however, we would like to reserve the right to amend the rules which we suggested at that time to bring them up to date in the light of experience which has been gained in Southeastern New Mexico and in the light of certain operating procedures including testing procedures which we understand have already been established in the Blanco-Mesaverde Pool. With that statement, we have no further evidence to offer in Case 330 at this time and no objection to its continuance, if that maybe the wish of the Commission.

MR. SPURRIER: Mr. Kelleher, do you have a motion?

MR. KELLEHER: Gentlemen of the Commission, I filed a motion asking for a continuance from May 19th to June 19th, if that date would be agreeable to the Commission or approximately that, for the reason we believe that the intervening time will afford all parties in interest an opportunity to correlate their findings and endeavor to reach some formula. We feel there might not be too great an objection upon which the Commission might act with intelligence. Therefore, we join in the request for a deferrment of the actual hearing

of the Case for a period of 30 days, if that is consistent with the wishes of the Commission.

MR. SPURRIER: Does anyone else have a comment in the Case?

MR. GRIENER: A. S. Griener, Southern Union Gas Company. I would like to suggest that a special meeting be given to this 330 or 330-A that at least two days be allowed for it or that if a one day setting be given that it be at such a time that it can be eventually carried over to the next day. All the indications at the Operators Committee meeting yesterday were that there might be a rather substantial volume of testimony that various interested parties might want to adduce. It seems to me it would be inappropriate to try and pick one day setting and then have to continue it to wind it up. It would be better if we could have a two day setting.

MR. SPURRIER: Anyone else?

MR. ZINN: I am speaking for King Lee Petroleum he is one small voice crying in the wilderness with three wells concerned. We concur in the recommendations made by Southern Union to give the people interested a couple of days because there is quite a bit to be said, .

MR. SPURRIER: Anyone else? We find that on account of the Commissioners being absent and Land Sales and one thing and another we can't set it up that particular week of the 19th, early in the week but we can set it up for the 18th which is on Friday. If necessary go over to, into Saturday, the 19th.

MR. SELINGER: Mr. Spurrier, I wanted to point out that in the resolution, the recommendation was that at least 30 days. It doesn't necessarily have to be exactly 30 days. As a matter of fact, I think that the longer time we operators have, the more apt we are

to present a more fuller hearing. It is a very complex problem and if you can't get it in that week or even in June, I think it would be of sufficient magnitude and help to the operators that it be set over to July. The more time, the more information we will be able to furnish the Commission.

MR. SPURRIER: I don't know if I agree with that or not, Mr. Selinger. We have been stalling around on this Case now for several months. I can say for the Commission right now that based on the information we have at the moment, that it is our present opinion that gas should be prorated in the San Juan Basin.

MR. SELINGER: We agree with you.

MR. SPURRIER: We want to give you all the time that is necessary to get a real record.

MR. SELINGER: We agree with you on the fact that there should be a proration of gas in the San Juan Basin. As a matter of fact, we would like to urge the Commission to put that into effect immediately and use a simple formula until such time as sufficient engineering data to sustain a proper allocation formula.

MR. SPURRIER: I might say that the Commission's staff will be prepared at the next hearing to put on testimony. If it becomes necessary, we can probably do just what you have suggested with the staff's testimony.

MR. SELINGER: I think setting this matter on a Friday, I think would be rather a poor thing because while some have judged it to be a two day hearing, I doubt if it will even be completed in two days. I would urge the Commission to set it at the first of the week and make as much time available as possible during that week.

MR. SPURRIER: All right, the Commission will all be here on the 21st, which is Monday, June 21st. We are agreed that we will continue the Case until June 21st at nine o'clock in this hall.

MR. TOWNSEND: Is it necessary that an order be issued by the Commission, consolidating the Cases so that the record in Case 330 will be a part of the record in Case 330-A?

MR. SPURRIER: I don't think an order is necessary, I think the record should show definitely that these cases are consolidated and that the testimony which we have taken so far in 330 will be incorporated in 330-A.

There is another matter for the record, I think that the Commission realizes what a lot of work this engineering sub-committee of the San Juan Basin Operators has done. We appreciate it. We don't want to give you the wrong idea about our comments on extending the time. We have no intention of extending the time indefinitely. We do appreciate the work that has been done and we want you to know that. The next Case on the docket is Case 696.

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

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 26th day of May, 1954.

Ada Dearnley
Notary Public, Court Reporter

My Commission expires:
June 19, 1955.

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

Santa Fe, New Mexico

* * * * *

TRANSCRIPT OF PROCEEDINGS

CASE NO. 330

Regular Hearing

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 15, 1954

IN THE MATTER OF:

Under terms of Order R-128-A entered on November 10, 1953, hearing was again set for this date on Stanolind Oil and Gas Company's application for the amendment of Order R-110 relating to the Blanco-Mesa Verde Pool, San Juan and Rio Arriba Counties, New Mexico. } Case No. 330

BEFORE:

Honorable Edwin L. Mechem, Chairman
Mr. E. S. (Johnny) Walker, Member
Mr. R. R. Spurrier, Secretary & Director

TRANSCRIPT OF HEARING

MR. SPURRIER: Is there anyone to be heard in Case 330?

MR. TOWNSEND: Jim Townsend for Stanolind Oil and Gas Company. At the time the case was called last month, or rather I should say a statement was made to the Commission last month that the case would be called this month and was requested by the San Juan operator or representative of the group that the case be continued. We understand that a petition has been filed by Pubco Development Corporation, a Company, that such case be continued and we have no objection to that. We think that probably it should be considered with the question of gas proration in the entire San Juan Basin, and Stanolind, while it is not urging the continuation, nor is it objecting to it, has no real concern about it being continued further at this time.

MR. SPURRIER: That is correct, Pubco did make a motion by letter for continuance. I don't have the letter at the moment. They did make a motion for continuance. As the Commission said at the last hearing, upon a proper motion we would continue the case to May 19th. Is there objection to Pubco's motion? If not the case will be continued to the regular May 19th hearing.

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

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the Oil Conservation Commission of the State of New Mexico, held on Thursday, April 15, 1954, in Mabry Hall, Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

DATED this 17th day of April, 1954, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Ada Dearnley
REPORTER

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO FOR THE PURPOSE OF CONSIDERING:

CASES 330 and 330-A
(Consolidated)
ORDER NO. R-128-C

THE APPLICATION OF STANOLIND OIL AND GAS COMPANY FOR AN ORDER AMENDING ORDER R-110 RELATING TO THE BLANCO-MESAVERDE GAS POOL, SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO.

AND ALSO:

THE APPLICATION OF THE OIL CONSERVATION COMMISSION UPON ITS OWN MOTION FOR AN ORDER PROMULGATING RULES AND REGULATIONS AFFECTING AND CONCERNING THE BLANCO-MESAVERDE GAS POOL, SITUATED IN SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

These causes came on for hearing at 9 o'clock a. m. on April 15, 1954 and June 21, 1954, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission".

NOW, on this 16 day of December, 1954, the Commission, a quorum being present, having considered the testimony adduced and the exhibits received at said hearings, and being fully advised in the premises,

FINDS:

(1) That due notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of these cases and the subject matter thereof.

(2) That under the date of February 25, 1949, the Commission issued its Order 799 creating the Blanco-Mesaverde Gas Pool. That Order 799 defined the vertical and horizontal limits of the Blanco-Mesaverde Gas Pool, and that by subsequent orders the Commission extended the horizontal limits of the Blanco-Mesaverde Gas Pool.

(3) That under the date of November 9, 1951, the Commission issued Order No. R-110, amending and revising Order 799, to provide for 320 acre proration units, drilling and pipe cementing procedures, well spacing, and other pertinent rules.

(4) That the producing capacity of the gas wells in the Blanco-Mesaverde Gas Pool is greater than the market demand of gas from the Blanco-Mesaverde Gas Pool.

(5) That for the purpose of preventing waste and for the protection of correlative rights Order R-110 should be amended to provide a method of allocating gas between proration units in the Blanco-Mesaverde Gas Pool.

IT IS THEREFORE ORDERED:

(1) That Order R-110, dated November 9, 1951 is hereby amended to read as follows:

Section 15: Gas Proration and Allocation

RULE 1. (a) The acreage allocated to a gas well for proration purposes shall be known as the Gas Proration Unit for that well. For the purpose of Gas Allocation in the Blanco-Mesaverde Gas Pool, a standard proration unit shall consist of between 316 and 324 contiguous surface acres, substantially in the form of a rectangle which shall be a legal subdivision (half section) of the U. S. Public Land Surveys; provided however, that a non-standard gas proration unit may be formed after notice and hearing or under the provisions of paragraph (b) of this rule. Any proration unit containing less than 316 acres or more than 324 acres shall be a non-standard proration unit. The allowable production from any non-standard proration unit as compared with the allowable production therefrom if such tract were a standard unit shall be in the ratio of the area of such non-standard proration unit expressed in acres to 320 acres. Any gas proration unit containing between 316 and 324 acres shall be considered to contain 320 acres for the purpose of computing allowables.

(b) The Secretary of the Commission shall have authority to grant an exception to Rule 1 (a) without Notice and Hearing where application has been filed in due form and where the following facts exist and the following provisions are complied with:

1. The non-standard gas proration unit consists of contiguous quarter-quarter sections and/or lots.

2. The non-standard gas proration unit lies wholly within a single governmental section.

3. The entire non-standard gas proration unit may reasonably be presumed to be productive of gas.

4. The applicant presents written consent in the form of waivers from (a) all operators owning interests in the section in which any part of the non-standard gas proration unit is situated and which acreage is not included in said non-standard gas proration unit, and (b) all operators owning interests in acreage offsetting the non-standard gas proration unit.

5. In lieu of paragraph 4 of this rule, the applicant may furnish proof of the fact that said offset operators were notified by registered mail of his intent to form such non-standard gas proration unit. The Secretary of the Commission may approve the application if, after a period of 30 days following the mailing of said notice, no operator has made objection to formation of such non-standard gas proration unit.

RULE 2. At least 30 days prior to the beginning of each gas proration period the Commission shall hold a hearing after due notice has been given. The Commission shall cause to be submitted by each gas purchaser its "Preliminary Nominations" of the amount of gas which each in good faith actually desires to purchase within the ensuing proration period, by months from the Blanco-Mesaverde Gas Pool. The Commission shall consider the "Preliminary Nominations" of purchasers, actual production, and such other factors as may be deemed applicable in determining the amount of gas that may be produced without waste from the pool within the ensuing proration period. "Preliminary Nominations" shall be submitted on a Form C-121-A as prescribed by the Commission.

RULE 3. In the event a gas purchaser's market shall have increased or decreased, he may file with the Commission prior to the 10th day of the month a "supplemental nomination", showing the amount of gas he actually in good faith desires to purchase during the ensuing proration month from the Blanco-Mesaverde Gas Pool. The Commission shall hold a public hearing between the 13th and 20th days of each month to determine the reasonable market demand for gas for the ensuing proration month, and shall issue a proration schedule setting out the amount of gas which each well may produce during the ensuing proration month. "Supplemental Nominations" shall be submitted on a Form C-121-A as prescribed by the Commission.

Included in the monthly proration schedule shall be (a) a summary of the total pool allocation for that month showing nominations, and adjustments made for underage or overage applied from a previous month, (b) a tabulation of the net allowable and production for the second preceding month together with a cumulative overage or underage computation, (c) a tabulation of the current and net allowables for the preceding month, (d) a tabulation of current monthly allowable for the ensuing proration month, and (e) a tabulation of the acreage and deliverabilities assigned each well, and the factors assigned each well for use in calculating individual well allowables. The Commission shall include in the proration schedule the gas wells in the Blanco-Mesaverde Gas Pool delivering to a gas transportation facility, or lease gathering system, and shall include in the proration schedule of the Blanco-Mesaverde Gas Pool any well which it finds is being unreasonably discriminated against through denial of access to a gas transportation facility, which is reasonably capable of handling the type of gas produced by such well. The total allowable to be allocated to the pool each month shall be equal to the sum of the preliminary or supplemental nominations (whichever is applicable), together with any adjustment which the Commission deems advisable.

If during a proration month the acreage assigned a well is increased the operator shall notify the Director in writing (Box 871, Santa Fe, New Mexico) of such increase. The increased allowable assigned the gas proration unit for the well shall be effective on the first day of the month following receipt of the notification by the Director.

RULE 4. The monthly allocation to the Blanco-Mesaverde Gas Pool shall be divided and allocated among the wells connected to a gas transportation facility in the following manner:

The product obtained by multiplying each well's acreage factor by the calculated deliverability (expressed as MCF per day) for that well shall be known as the "AD factor" for that well. The acreage factor shall be determined to the nearest hundredth of a unit by dividing the acreage within the proration unit by 320. The "AD factor" shall be computed to the nearest whole unit.

(1) A tentative allocation shall be made by dividing seventy-five percent (75%) of the pool allocation among the wells in the proportion that each well's "AD factor" bears to the sum of all the "AD factors" in the pool.

(2) The remaining twenty-five (25%) of the pool allocation shall be divided among the wells in the proportion that each well's acreage factor bears to the sum of all the acreage factors in the pool.

When the tentative allowable received by a well is in excess of its known producing ability the well shall be classed as a marginal well and its allowable limited to its known producing ability. The sum of the difference between the tentative allowables and the limited allowables of all marginal wells on the proration schedule shall be reallocated to the non-marginal wells by application of the same formula. If such reallocation shall result in placing any other well within the marginal classification, the difference between the tentative allowable and the limited allowable of such marginal well shall be redistributed by application of the same formula until no well has received an allowable in excess of its known producing ability.

RULE 5.

The calculated deliverability at the "deliverability pressure" shall be determined in accordance with the provisions of Order R-333-A; provided however, that the deliverability pressure shall be determined as follows:

"Deliverability pressure", as used herein shall be equal to fifty (50) per cent, of the seven (7) day shut-in pressure of the respective individual wells.

BALANCING OF PRODUCTION

RULE 6. Underproduction: The dates 7:00 a.m., February 1, and 7:00 a.m., August 1, shall be known as balancing dates and the periods of time bounded by these dates shall be known as gas proration periods. In order to effectively administer the prorationing of gas in the Blanco-Mesaverde Gas Pool, it is advisable to have a portion of each proration period include both summer and winter months. Therefore the first proration period shall commence March 1, 1955 and shall continue for a period of 11 months and future proration periods shall commence on the dates outlined

above. The amount of current gas allowable remaining unproduced at the end of each proration period shall be carried forward to and may be produced during the next succeeding proration period in addition to the normal gas allowable for such succeeding period; but whatever amount thereof is not made up within the first succeeding proration period shall be cancelled.

If it appears that such continued underproduction has resulted from inability of the well to produce its allowable, it may be classified as a marginal well and its allowable reduced to the well's ability to produce.

If at the end of a proration period a marginal well has produced more than the total allowable assigned a non-marginal unit of corresponding size and deliverability, the marginal well shall be reclassified as a non-marginal well and its allowable prorated accordingly.

If during a proration period a marginal well is reworked or recompleted in such a manner that its productive capacity is increased to the extent that it should be reclassified as a non-marginal well, the reclassification shall be effective on the first day of the proration month following the date of recompletion.

The Director may reclassify a well at any time if production data or deliverability tests reflect the need for such a reclassification.

RULE 7. Overproduction: A well which has produced a greater amount of gas than was allowed during a given proration period shall have its allowable for the first succeeding proration period reduced by the amount of such overproduction and such overproduction shall be made up within the first succeeding proration period. If, at any time, a well is overproduced an amount equaling six times its current monthly allowable, it shall be shut-in during the current month.

The Commission may allow overproduction to be made up at a lesser rate than would be the case if the well were completely shut-in upon a showing at public hearing after due notice that complete shut-in of the well would result in material damage to the well.

GRANTING OF ALLOWABLES

RULE 8. No gas well shall be given an allowable until Form C-104 and Form C-110 have been filed together with a plat showing acreage attributed to said well and the locations of all wells on the lease.

RULE 9. Allowables to newly completed gas wells shall commence on the date of connection to a gas transportation facility, as determined from an affidavit furnished to the Commission (Box 697, Aztec, New Mexico) by the purchaser, or the date of filing of Form C-104 and Form C-110 and the plat described above, whichever date is the later.

No well shall be assigned an allowable unless either a deliverability test, or a potential test taken in conformance with the provisions of Order R-333-A has been submitted.

In assigning allowables to newly completed wells in the absence of deliverability test data the open flow potential test taken in conformance with Order R-333-A may be used in approximating the wells deliverability. In this instance an assumed deliverability equal to 20% of the volume of gas produced on the initial potential test will be used. The allowable thus established using an assumed deliverability shall be a tentative allowable and upon submission of a deliverability test the allowables previously assigned the well shall be recalculated using the deliverability test data.

Deliverability tests shall be taken and calculated in conformance with Order R-333-A, the provisions of Rule 5 of this order and the testing schedule provisions of Order R-333-A.

Deliverability tests taken during 1954 shall be used in calculating allowables for the proration period commencing March 1, 1955. Subsequent annual tests shall be used in calculating allowables for proration periods commencing during the next ensuing year.

REPORTING OF PRODUCTION

RULE 10. The monthly gas production from each well shall be metered separately and the gas production therefrom shall be reported to the Commission on Form C-115 so as to reach the Commission on or before the 24th day of the month next succeeding the month in which the gas was produced. The operator shall show on such report what disposition has been made of the gas produced.

Each purchaser or taker of gas in the Blanco-Mesaverde Gas Pool shall submit a report to the Commission so as to reach the Commission on or before the 24th day of the month next succeeding the month in which the gas was purchased or taken.

Such report shall be filed on either Form C-111 or Form C-114 (whichever is applicable) with the wells being listed in approximately the same order as they are listed on the proration schedule.

Forms C-111 and C-114 referred to herein shall be submitted in triplicate, the original being sent to the Commission at Box 871, Santa Fe, New Mexico, the other copies being sent to Box 697, Aztec, New Mexico and Box 2045, Hobbs, New Mexico.

Form C-115 shall be submitted in accordance with Rule 1114 of the Commission's Rules and Regulations.

The full production of gas from each well shall be charged against the well's allowable regardless of what disposition has been made of the gas, provided however, that gas used in maintaining the producing ability of the well shall not be charged against the well's allowable.

RULE 11. The term "gas purchaser" as used in these rules, shall mean any "taker" of gas either at the wellhead or at any point on the lease where connection is made for gas transportation or utilization. It shall be

the responsibility of said "taker" to submit a nomination.

RULE 12. No gas, either dry gas or casinghead gas, produced from the Blanco-Mesaverde Gas Pool except that gas used for "drilling-in purposes, shall be flared or vented unless specifically authorized by order of the Commission after notice and hearing.

PROVIDED FURTHER, That in filing Form C-101 "Notice of Intention to Drill or Recomplete" or USGS Form 3-391-a (whichever is applicable), all operators shall strictly comply with the provisions of Order R-110 and the applicable provisions of Order R-397. Accompanying the above form shall be a plat of the acreage contained in the proration unit together with a complete list of all working interest owners designating the acreage they hold within the communitized area dedicated to the well.

PROVIDED FURTHER, That failure to comply with the provisions of this order or the rules contained herein shall result in the cancellation of allowable assigned to the affected well. No further allowable shall be assigned to the affected well until all rules and regulations are complied with. The Director shall notify the operator of the well and the purchaser in writing of the date of allowable cancellation and the reason therefor.

PROVIDED FURTHER, That the provisions of Statewide Rule 104 (k) shall not apply to the Blanco-Mesaverde Gas Pool.

PROVIDED FURTHER, That all transporters of gas or users of gas shall file with the Commission a list of all wells connected to their gas transportation facility as of February 1, 1955, and shall furnish connection notices thereafter in accordance with the provisions of Rule 9 as soon as possible after the date of connection.

The list requested above shall contain the name of the operator, lease name, well number, unit, and location of the well (Section, Township and Range). Connection notices shall contain the date of connection in addition to the above listed data.

DONE at Santa Fe, New Mexico, the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

E. S. WALKER, Member

W. B. MACEY, Member and Secretary

Release 12-16-54
OIL CONSERVATION COMMISSION

The first supervised proration of natural gas in the prolific San Juan Basin area will begin on March 1 with proration of gas production in the Blanco-Mesaverde Gas Pool in San Juan and Rio Arriba Counties, the Oil Conservation Commission announced today.

In a special executive session held Thursday morning immediately before the start of the regular Commission hearing, the proration order was signed by Governor Edwin L. Mechem, Commission chairman, Land Commissioner E. S. 'Johnny' Walker, member, and W. B. Macey, secretary and director.

The Blanco-Mesaverde Pool contains approximately 700 gas wells which will now fall under the new proration system, which will be set up in a manner somewhat similar to that used in prorating the great gas pools of Lea County, Macey said.

Other proration orders will be forthcoming within the next two weeks, Macey announced. Those scheduled for such action include pools producing from the Pictured Cliffs formation, which is one of the most productive gas horizons in the Basin area.

The proration formula worked out by Commission engineers will be set up with 75 per cent of production allocated to a well on an acreage-times-deliverability basis, with the remaining 25 per cent allocated on an acreage basis.

Macey said that the Commission considered the advisability of putting a maximum or minimum allowable provision into the order, but due to large fluctuations in market demand, these were deemed inadvisable.

A standard proration unit for the Blanco-Mesaverde Pool will be 320 acres, with deviation from this size possible after special consideration by the Commission.

Pub. Com. Folder
Corr. Folder

SOUTHERN UNION GAS COMPANY
BURT BUILDING
DALLAS 1, TEXAS

LEGAL DEPARTMENT
WILLIS L. LEA, JR.
GENERAL ATTORNEY

A. S. GRENIER
QUILMAN E. DAVIS
MILLARD F. CARR
EDWARD G. TAYLOR
JACK HERTZ

January 30, 1954

FEB 1 1954

Mr. R. R. Spurrier
Oil Conservation Commission
State of New Mexico
Santa Fe, New Mexico

Dear Mr. Spurrier:

In accordance with the Commission's Order No. R-128-B, I am enclosing on behalf of Southern Union Gas Company, El Paso Natural Gas Company and Stanolind Oil and Gas Company a conformed copy of the Gas Purchase Contract entered into on August 31, 1953 between Southern Union Gathering Company, a wholly-owned subsidiary of Southern Union Gas Company, as Seller, and El Paso Natural Gas Company, as Buyer, under which gas is to be sold to El Paso Natural Gas Company in the Blanco Field of San Juan County, New Mexico.

Since it was impossible at that time to work out a definite allocation or ratable-taking formula, the parties agreed in general terms to attempt to effect ratable withdrawal of gas in the San Juan Basin. These general provisions are contained in Article V of the enclosed contract.

With best personal regards, I am

Yours very truly,

Q. L. Lara

QBD:FG
Encl.

cc: Mr. Ben Howell
El Paso Natural Gas Company
El Paso, Texas

Mr. J. R. Smith
Stanolind Oil and Gas Company
Fort Worth, Texas

NATURAL GAS CONTRACT

THIS AGREEMENT, made and entered into this 31st day of August, 1953, by and between SOUTHERN UNION GATHERING COMPANY, a Delaware corporation authorized to transact business in New Mexico (herein sometimes called "Seller"), and EL PASO NATURAL GAS COMPANY, a Delaware corporation authorized to transact business in New Mexico (herein sometimes called "Buyer"),

W I T N E S S E T H :

WHEREAS, Buyer and Seller each is the owner and operator of facilities for the gathering of natural gas from wells producing from the Pictured Cliffs or Mesaverde formations in San Juan and/or Rio Arriba Counties, New Mexico, and Buyer and Seller are desirous that withdrawals of natural gas be ratable as between all such wells now or hereafter connected to their respective gathering facilities; and

WHEREAS, Buyer is engaged in the transportation and sale through pipe lines of large volumes of natural gas in New Mexico and Arizona [redacted], and it appears desirable that Buyer purchase from time to time quantities of natural gas from Seller to effectuate the aforesaid purpose of ratable withdrawal of gas from wells and for the supply of Buyer's markets: DNT JCR

NOW, THEREFORE, in consideration of the premises and of their reciprocal covenants and agreements herein contained, Seller and Buyer have agreed and do now agree together as follows, to wit:

ARTICLE I

AGREEMENT TO SELL AND BUY

Seller agrees to deliver and sell to Buyer and Buyer agrees to receive and purchase from Seller natural gas pursuant to the terms and provisions hereof.

ARTICLE II

POINT(S) OF DELIVERY AND METER(S)

1. Deliveries of gas hereunder shall be made to Buyer in Section 32, Township 30 North, Range 9 West, N.M.P.M., at the point of connection between the facilities of Seller and Buyer. The parties may in writing agree upon the delivery of gas at any alternate or additional locations on Seller's gathering

lines.

2. At such location(s) Seller will install, maintain, repair and operate a regulating and measuring station properly equipped with standard type meters, recording gauges, and thermometers and other appropriate devices, the readings of which shall, subject to Section 8 of this Article, fix and determine the volumes of natural gas delivered to Buyer.

3. All equipment so installed by Seller, together with any building(s) erected by it for such equipment, shall remain its sole property and exclusively under its control; provided that Buyer's representatives shall have access thereto, in company with a representative of Seller, at reasonable times.

4. The reading, calibration and adjusting of such equipment, as well as the changing of charts, shall be done only by the representatives of Seller.

5. The point(s) of delivery of gas to Buyer shall be at the point(s) of connection of its facilities with those of the Seller at the outlet of Seller's measuring devices on the downstream side thereof.

6. Upon request of Buyer, Seller will submit to Buyer the charts and records of such measuring equipment together with Seller's calculations therefrom for Buyer's inspection and verification subject to return by Buyer within ten (10) days after receipt thereof, after which return the charts and records shall be kept on file by Seller for the use of either party for a period of five (5) years and then may be destroyed by Seller.

7. If either party desires at any time to test any meter of Seller or any check meter of Buyer (if installed and in service), it will notify the other party of the desire for such test and the time for such test shall be set promptly by the other party. Each party will then cooperate to secure a joint calibration test and observance of any adjustment, and the meter or meters involved shall be adjusted to accuracy.

8. If upon any test any such measuring equipment is found to be incorrect by two per cent (2%) or more, fast or slow, adjustment shall be made for gas deliveries during the period when such equipment was registering inaccurately, which period shall not in any event be deemed to extend prior to the period covered by the monthly statement immediately preceding the one giving rise to

complaint or request for test unless the parties shall agree to a different period. Following any test, the measuring equipment found to be inaccurate shall be restored as quickly as is feasible to a condition of accuracy by the owner thereof. If for any reason Seller's measuring equipment at any location is out of service or repair so that the amount of natural gas cannot be ascertained or computed from the readings thereof, the natural gas delivered through such equipment during such period shall be estimated and agreed upon by the parties on the basis of the best data available, using the first of the following three methods which is feasible:

(a) By using the registration of any check meter or meters of Buyer if installed and correctly registering.

(b) By correcting the error if the percentage of error is ascertainable by calibration test or mathematical calculation.

(c) By estimating the quantity of delivery from the deliveries made during preceding periods under similar conditions when accurate measurement was being obtained.

ARTICLE III

MEASUREMENT

1. The unit of measurement shall be one thousand (1,000) cubic feet of natural gas at a base temperature of sixty degrees (60°) Fahrenheit, and at a base pressure of fifteen and twenty-five thousandths pounds (15.025#) per square inch absolute, and the readings and registration of the measuring equipment shall be computed into such units.

2. For the purpose of measurement the average atmospheric (barometric) pressure shall be the mean barometric pressure for each point of delivery hereunder, and correction for deviation from Boyle's law shall be made, as determined in accordance with Bulletin T. S. 402, copyrighted 1941, and with Bulletin T. S. 461, copyrighted 1947, by the California Natural Gasoline Association, at intervals of not more than three (3) months or at such other intervals as may be found necessary because of varying operating conditions. The deviation so determined shall be used in computing volumes until the next succeeding such determination, and due consideration shall be given to the gravity and average daily temperature of the gas. Buyer shall have the right and opportunity to check Seller's determinations of deviation.

3. For meters of the orifice type, the following factors shall be given due consideration, to wit:

(a) The temperature of the natural gas flowing through Seller's meters shall be obtained by the use of a recording thermometer so installed that it may properly record the temperature of the natural gas flowing through the meters. The average temperature recording during each twenty-four (24) hour day shall be used in computing gas volumes.

(b) The specific gravity of the natural gas shall be determined by an Edward's balance or other mutually acceptable instrument of standard type. The gravity tests shall be made by Seller at least once each three (3) months and the gravity so determined shall be used in the computation of gas volumes until the next ensuing gravity test.

4. Seller's meters shall be calibrated by Seller at least once each three (3) months at Seller's expense, in the presence of a representative of Buyer if Buyer so elects.

5. Buyer may at its option and expense install and operate check meter(s) downstream of and adjacent to any point of delivery, and such equipment, together with any building erected by Buyer therefor, shall be and remain its property. If check metering equipment is installed by Buyer, representatives of Seller shall have access thereto in company with a representative of Buyer at all reasonable times, but the reading, calibration and adjusting of such equipment and changing of charts shall be done only by Buyer's representatives. Charts and records from Buyer's said equipment shall remain the property of Buyer, but on the request of Seller Buyer shall submit the same to Seller, together with Buyer's calculations therefrom, for Seller's inspection and verification, subject to return by Seller within ten (10) days after receipt thereof.

ARTICLE IV

QUALITY OF GAS

1. Gas delivered hereunder shall be dry natural gas with a gross heating value of not less than 950 B.T.U. per standard cubic foot, determined by means of a flow calorimeter of the Junkers or other standard type according to the method prescribed by the U. S. Bureau of Standards for determining the total calorific value of natural gas. It shall be free from dilution or contamination to any significant degree by vapors, liquids, solid matter, air or other foreign substance. It shall have been subject to no treatment changing the chemical

composition of its hydrocarbon content or impairing its usefulness or characteristics as fuel, provided that nothing herein shall be construed to prevent the extraction from gas of any acid gas or nitrogen or helium content or water by ordinary commercial methods. Seller also reserves the continuing right, prior to delivery of gas to Buyer hereunder, to remove and extract therefrom all gasoline and other liquids by means, but only by means, of non-absorptive processes such as the use of drips and ordinary fields separators. Any gasoline or other natural content of the gas when delivered to Buyer shall become its property without the payment of additional consideration, and Seller's warranties shall apply thereto.

2. Gas delivered hereunder shall not contain in excess of .25 grains of hydrogen sulphide (H_2S) or 5 grains of total sulphur (including compounds thereof) per 100 standard cubic feet.

ARTICLE V

QUANTITIES OF GAS

1. Buyer agrees to receive and purchase hereunder volumes of natural gas which, with the volumes being sold by Seller to others from time to time, will enable Seller to withdraw gas from the Pictured Cliffs and Mesaverde wells in San Juan and Rio Arriba Counties, New Mexico, connected to Seller's gathering facilities, on not less than the same basis of ratable withdrawal being practiced by Buyer with respect to other wells producing from said formations in said counties and connected to Buyer's gathering facilities, without any unnecessary or unreasonable difference in treatment being accorded to Seller's sources at any time.

2. All withdrawals from the aforesaid wells shall at all times be kept in reasonably close balance according to the principles of ratable withdrawal contemplated above, and Buyer's purchases of gas from Seller shall be such that any overage or underage at any January 1 or July 1 during the term hereof in the withdrawals from any such well connected to Seller's lines may be adjusted and absorbed within a period of six (6) months thereafter.

3. During the first three full calendar years, Buyer shall have the right to purchase hereunder from Seller, and Seller hereby agrees to deliver hereunder

to Buyer, up to but not exceeding the following maximum volumes of gas in any 24-hour period (herein referred to as "Contracted Maximum Daily Demand"):

Year	M.M.C.F.
1954	40
1955	30
1956	20

Seller also agrees, from time to time during the term of this agreement, to deliver to Buyer hereunder such additional volumes of gas, if any, as may be necessary to permit Buyer to fulfill its purchase obligations under Sections 1 and 2 of this Article.

4. Deliveries and purchases of gas as provided in Section 1 of this Article shall commence as soon as the parties may with due diligence prepare themselves, respectively, to deliver and to receive such gas, and shall commence, in any event, not later than September 1, 1953, to the end that ratable withdrawal of gas hereunder may be achieved and in effect from that date.

5. It is contemplated that from time to time the parties hereto may, by mutual consent, expressed in the form of a written supplement to this agreement, effect changes in the schedule of Contracted Maximum Daily Demands set forth in Section 3 of this Article, so as to provide for Contracted Maximum Daily Demands to be applicable to years after 1956 or so as to increase, decrease or eliminate the Contracted Maximum Daily Demand applicable to any year(s) during the term of this agreement.

6. If and whenever during the term hereof Buyer and Seller shall agree that within the next six (6) months the pressure being maintained in Buyer's lines through natural wellhead flowing pressures (i.e., unincreased by any compression) will be such, in relation to the pressure(s) available to Seller at the point(s) of delivery hereunder, that Seller will be unable to deliver to Buyer hereunder the quantities of gas provided for in this Article, and that such condition can economically be corrected through installation and operation of compression facilities, Seller shall have a period of thirty (30) days after the date of such agreement within which to determine and to signify to Buyer whether or not Seller is able and willing to install, maintain and operate the necessary compression facilities upon its gathering system to increase appropriately the

pressure of gas to be delivered hereunder. Unless Seller elects to proceed with the timely installation and operation of such compression facilities and so notifies Buyer in writing within the said thirty (30) day period, then Buyer shall proceed to install, maintain and operate such compression facilities as are necessary to enable it to receive and purchase the volumes of gas provided for in this Article. Any agreement on the part of Seller or obligation on the part of Buyer to install compression facilities as contemplated in this Section shall be subject to such party's ability to obtain all necessary consents or authorizations of governmental authorities.

7. The provisions and obligations of this Article are of the essence of this agreement. Anything in this Article to the contrary notwithstanding, however, all Buyer's purchase obligations hereunder shall be subject to such limitations as may be imposed from time to time by the then capacity of Buyer's facilities, and Buyer's said purchase obligations shall at all times be limited to production from an aggregate of not to exceed one hundred (100) Pictured Cliffs or Mesaverde wells connected to Seller's gathering facilities.

ARTICLE VI

PRICES

1. The price to be paid by Buyer to Seller for all gas delivered hereunder shall consist of (a) the gathering charge provided for below in this Article, plus (b) the average wellhead cost to Seller of the gas delivered hereunder; provided, however, that in computing such average wellhead cost of gas to Seller the price paid by Seller for any gas, if higher than the highest price being paid at the time by Buyer for gas of like quality, volume and pressure at the wellhead in the San Juan Basin, shall be reduced to such highest price being paid by Buyer; and provided, further, that for purposes of such computations Buyer's said highest price per M.C.F. shall never be taken to be less than that prevailing at the time under its existing gas purchase contracts in the San Juan Basin, which contracts currently provide

for prices per M.C.F. at the wellhead of not less than the following:

Years	Mesaverde Gas	Pictured Cliffs Gas
1954-1958	12¢	10¢
1959-1963	13¢	11¢

nor shall Buyer's said highest price in any event be taken to be less than that stated immediately above during the years 1954 to 1956, both inclusive.

2. The gathering charge to be paid by Buyer to Seller hereunder shall consist of (a) a commodity component and (b) during those periods for which there is in effect a Contracted Maximum Daily Demand hereunder, a demand component.

3. Until January 1, 1957, it is agreed that the demand component of the gathering charge hereunder shall be 58-1/3¢ per month per M.C.F. of then effective Contracted Maximum Daily Demand, and that the commodity component of such gathering charge shall be 2-1/2¢ per M.C.F. of gas delivered hereunder.

4. The demand component and the commodity component of the gathering charge above provided for shall be revised as of January 1, 1957, and as of January 1 of each third year thereafter during the term of this agreement, so as to be respectively equal for each such three-year period to the demand component and the commodity component of the gathering charge payable during such period to Buyer herein for equal volumes of gas or of Contracted Maximum Daily Demand under the natural gas contract being entered into of even date herewith between Buyer herein, as seller, and Southern Union Gas Company, as buyer. It is recognized, however, that gas is to be delivered under said natural gas contract between Buyer and Southern Union Gas Company at a pressure of not less than 600 pounds per square inch gauge and that from time to time deliveries of gas may be made hereunder at lesser pressure(s). Accordingly, if as of any said January 1 it appears that during the three-year period commencing on such date Seller will be delivering gas hereunder at an average pressure for the period of less than 600 pounds per square inch gauge, in computing the demand and commodity components of the gathering charge to be paid during such period by Buyer to Seller hereunder, adjustments shall be made for any differences in costs of service attributable to the difference between (a) the average pressure at which it is estimated gas will be delivered hereunder during such three-year period and (b) a pressure of 600 pounds per square inch gauge.

5. During the twelve months preceding January 1, 1957, and preceding January 1 of each third year thereafter, Buyer shall submit in written form to Seller complete data pertinent to ascertainment, pursuant to Section 4 of this Article, of the demand component and the commodity component of the gathering charge to be paid by Buyer hereunder during the three-year period commencing on such January 1.

6. Should the price payable for gas delivered hereunder during any three-year period after December 31, 1956, not be finally settled prior to the beginning of such period, deliveries of gas hereunder may nevertheless be continued and Buyer will deposit monthly with Seller sums estimated by Seller as appropriate to compensate it on the basis provided for by Section 4 of this Article, subject to adjustment between the parties by cash payment promptly following establish-

ment of the price therefor.

7. If and whenever Buyer places in operation compression facilities as contemplated by Section 6 of Article V hereof, Buyer will supply the necessary compression at its actual full cost of service for such compression, including a six per cent (6%) rate of return (or such higher rate of return as the Federal Power Commission is then allowing to Buyer in rates fixed for its sale of gas in interstate commerce) upon Buyer's rate base in the compression facilities installed, maintained and operated for purposes of receiving gas delivered hereunder, such cost of service, including rate of return, being developed in the manner employed by the Federal Power Commission in the exercise of its authority under the Natural Gas Act, as amended and then in effect, Seller to reimburse Buyer for its said cost of service monthly as provided in Section 8 below.

8. Not less than thirty (30) days prior to the date upon which Buyer intends to put into operation compression facilities as contemplated in Section 6 of Article V hereof, Buyer shall notify Seller in writing of its estimate for the remainder of the then current calendar year of the average cost of service to Buyer, as aforesaid, per M.C.F. of gas to be compressed. Not less than thirty (30) days prior to each January 1 that this agreement remains in effect thereafter, similar notice shall be given by Buyer to Seller of its estimate of such compression costs for the next ensuing calendar year. Each month in which Buyer is due reimbursement for compression costs, the sum due Buyer on the basis of Buyer's estimate, as aforesaid, shall be deducted from the sums otherwise payable hereunder for such month by Buyer to Seller. As promptly as feasible following the close of each calendar year, Buyer shall definitively determine its actual cost of service for compression for such year on the basis provided for in Section 7 of this Article and shall submit to Seller in written form complete data pertinent to the making of such determination. If Seller concurs in Buyer's determination, it shall promptly so notify Buyer and adjustment shall be made forthwith between the parties by cash payment to compensate for any difference between (a) the aggregate of the compression charges deducted for the year on the basis of Buyer's estimates, and (b) the aggregate of Buyer's actual costs of service for compression for the year as finally determined. If the parties

fail to agree upon any such determination after reasonable efforts and negotiations, resort shall be had to arbitration in the manner provided for in Article XVII hereof for the purpose of establishing Buyer's reimbursible compression costs for the year.

ARTICLE VII

BILLING AND PAYMENT

1. Buyer agrees to pay to Seller at the latter's offices in Dallas, Texas, not later than the 25th day of each month for all gas delivered during the preceding month (including the applicable monthly demand component of the gathering charge) provided Buyer shall have at least ten (10) days after receipt of Seller's bill before payment thereof is due. Should Buyer fail to pay when due any amount owing Seller for gas delivered hereunder, Seller may charge Buyer interest at the rate of six per cent (6%) per annum from such due date until paid, and shall also have the right to discontinue deliveries hereunder whenever any gas bill due, to the extent not excepted to as provided in Section 2 of this Article, remains unpaid for thirty (30) days after written notice to Buyer of Seller's intention to discontinue.

2. Unless exceptions shall be made in writing by Buyer to Seller within ninety (90) days after Buyer's receipt of any gas bill, the bill and the volumes of gas represented thereby shall be conclusive upon the parties except as to retroactive adjustments on account of meter inaccuracy as provided in Section 8 of Article II.

ARTICLE VIII

TERM

This agreement shall be in full force and effect continuously from its mutual execution and delivery by the parties for and during a term ending December 31, 1973, at midnight, and from month to month thereafter unless and until terminated by written notice of termination by one party to the other at least one full calendar month in advance of the date so fixed for termination, which may be December 31, 1973, or at the end of some subsequent calendar month.

ARTICLE IX

FORCE MAJEURE

1. In the event either party is rendered unable, wholly or in part, by force majeure to carry out its obligations under this agreement (other than to make payments of amounts due hereunder), it is agreed that the obligations of the party whose performance is prevented by such force majeure shall, to that extent only, be suspended during the continuance of any inability so caused but for no longer period, and such cause shall, so far as possible, be remedied by such party with all reasonable dispatch. The term "force majeure", as employed herein, shall mean acts of God, strikes, and similar disturbances, inability during periods of national emergency to obtain pipe or other materials or equipment in the exercise of diligence by commercial methods, riots, epidemics, landslides, lightning, earthquakes, fires, storms, floods, washouts, arrests and restraint of rulers and people, civil disturbances, explosions, breakage or accident to machinery or lines of pipe, freezing of wells or lines of pipe, sudden partial or entire failure of natural gas wells, and any other cause, whether of the kind herein enumerated or otherwise, not within the control of the party claiming suspension and which, by the exercise of due diligence, such party is unable to anticipate or overcome. Nothing contained herein, however, shall be construed to require either party to settle a strike or other labor dispute or disturbance against its will. The party whose performance is affected by force majeure shall promptly notify the other party, using the speediest means of communication reasonably available under the circumstances, stating the force majeure and its probable effect and duration, and shall confirm such notice in the manner provided in Article XII.

2. It is expressly agreed that Seller may interrupt or curtail its deliveries hereunder, and that Buyer may interrupt its acceptance of deliveries hereunder, for the purpose of making necessary alterations and repairs to its pipelines or compression facilities, but only for such time and to such extent as may be reasonable and unavoidable, and shall give the other party, except in case of emergency, reasonable advance notice of its intention so to do, and shall endeavor to arrange such interruption so as to inconvenience the other

party as little as possible.

ARTICLE X

WARRANTY OF TITLE

Seller warrants (general warranty) its title to and right to sell and deliver all gas hereunder, free and clear of liens and adverse claims of whatever nature in money or in kind; and agrees to indemnify and hold harmless the Buyer from all suits, claims, damages, liens, costs and expenses arising from or out of adverse claims or liens, howsoever arising or asserted, with respect to the title to said gas or any interest therein or the proceeds of sale thereof.

ARTICLE XI

OTHER PERSONS

1. This agreement shall bind and benefit the respective successors and assigns of the parties hereto but shall not be transferred or assigned by either party without the consent of the other party; provided, however, that this agreement and all rights and obligations of either party hereby created may be transferred or assigned by such party without the consent of the other party pursuant to any plan of reorganization, merger and/or consolidation and/or concurrently with the mortgage or sale, pursuant to the foreclosure of any mortgage or deed of trust, of all or any part of the properties of such party affected by this agreement. If all or any part of the facilities of Seller at the time required for the delivery of gas hereunder and/or all or any part of the facilities of Buyer at the time required for its resale of gas hereunder be voluntarily sold or exchanged by the party then owning same (including transfer by merger or consolidation), then and in such event the parties respectively agree that they will cause the person, firm or corporation so acquiring all or any part of such facilities expressly to agree to take and hold the same subject to the obligations created by this agreement applicable to the facilities so sold or exchanged; provided, however, without consent of the other, either party may assign its right, title and interest in, to and under this agreement to a trustee or trustees, individual or corporate, as security for bonds or other obligations or securities, without such trustee or trustees assuming or becoming in any respect obligated to perform the obligations of the assignor under this

agreement and, if any such trustee be a corporation, without its being required to qualify to do business in any state in which such property(ies) in whole or in part may be located; and provided, further, no assignment or transfer herein contemplated shall operate to relieve the assigning party of any obligation hereunder.

2. This agreement shall not, in whole or in part, either bind or inure to the benefit of any person, firm or corporation other than the original parties hereto, their respective successors and assigns, and no other shall at any time have or claim any interest herein or benefit hereunder.

ARTICLE XII

NOTICES

Any notice to be given hereunder shall be deemed sufficiently given and served when and if posted in the United States mail, registered and postage prepaid, addressed to Buyer at El Paso, Texas, or to Seller at Dallas, Texas, as the case may be, or at such other address as either may hereafter designate in writing to the other for such purpose. Routine matters, such as monthly statements and ordinary correspondence, shall be considered posted when sent by ordinary mail. In cases of emergency, notice shall be given by telephone or telegram or in person to the nearest office of Seller or Buyer, as the case may be, and thereafter confirmed in writing as in this Article above provided.

ARTICLE XIII

LAWS AND REGULATIONS

Any provision herein to the contrary notwithstanding, this agreement is subject to and in contemplation of all valid laws and rules, regulations and orders of duly constituted regulatory authorities, State and Federal, applicable to the subject matter hereof and effective from time to time. This agreement having been made with reference to the laws of New Mexico, such laws shall be applied in the determination of any substantive question which may arise hereunder.

ARTICLE XIV

LIABILITY

As between the parties hereto, Seller shall be in control and possession

of its natural gas deliverable hereunder and responsible for any damage or injury caused thereby until the same shall have been delivered to Buyer at any point of delivery, at which point the title to such gas delivered as well as the responsibility for its safe conduct and handling shall pass from Seller to Buyer.

ARTICLE XV

TERMINATION

If either party shall fail to perform any of the covenants or obligations imposed upon it under and by virtue of this agreement (except where such failure shall be excused under provisions of this agreement), then in such event the other party may at its option terminate this contract by proceeding as follows: The party not in default shall cause a written notice to be served on the party in default, stating specifically the cause for terminating this contract and declaring it to be the intention of the party giving the notice to terminate the same, thereupon, the party in default shall have sixty (60) days after the service of the aforesaid notice in which to remedy or remove the cause or causes stated in the notice for terminating the contract, and if within said period of sixty (60) days the party in default does so remove or remedy said cause or causes and fully indemnify the party not in default for any and all consequences of such breach, then such notice shall be ineffective and this agreement shall continue in full force and effect. In case the party in default, within said period of sixty (60) days, does not so remedy and remove the cause or causes or does not indemnify the party giving the notice for any and all consequences of such breach, then this agreement shall become null and void from and after the expiration of said period. Any cancellation of this agreement pursuant to the provisions of this Article shall be without prejudice to the right of the party not in default to collect any amounts then due it and without waiver of any other remedy to which the party not in default may be entitled for violation of this agreement.

ARTICLE XVI

DEFINITIONS

When used herein:

(a) The term "day or "daily" means a consecutive period of twenty-four

(24) hours.

(b) The term "year" means a calendar year, and the term "month" means a calendar month.

(c) The term "M.C.F." means 1,000 cubic feet and the term "M.M.C.F." means 1,000,000 cubic feet of gas, under the conditions set forth in Section 1 of Article III.

(d) The term "Federal Power Commission" includes any successor federal agency exercising jurisdiction similar to that conferred under the Natural Gas Act, as amended and in effect from time to time.

(e) The terms "Seller" and "Buyer" and "parties" include the respective successors and assigns of the original parties hereto.

ARTICLE XVII

ARBITRATION

1. The arbitration provided for in Section 8 of Article VI, and all other matters of dispute which the parties hereto shall agree to submit to arbitration, shall be submitted for determination to a Board of Arbitrators chosen as provided below.

2. On the written demand of either party and within five (5) days from the date of demand, each party shall name an arbitrator, and these two so named shall promptly thereafter choose a third. If either party shall fail to name an arbitrator within five (5) days from said demand, the other party shall name the second arbitrator as well as the first, or if the two arbitrators shall fail within ten (10) days from their appointment to agree upon and appoint the third, then upon written application by either party such third arbitrator shall be appointed by the American Arbitration Association, and if said American Arbitration Association shall not be in existence or shall fail to act, then such third arbitrator shall be appointed by the person who is the Judge then in office of the District Court of the United States of America having jurisdiction over San Juan County, New Mexico.

3. The Board of Arbitrators so chosen shall proceed immediately to hear and determine the question in dispute, deciding same in accordance with the terms of this agreement. The Board of Arbitrators shall have no authority to

supplement or in any way modify the terms and provisions of this agreement.

4. The decision of the Board of Arbitrators, or a majority thereof, shall be made within forty-five (45) days after the appointment of the third arbitrator, subject to any reasonable delay due to unforeseen circumstances. In the event the Board, or a majority thereof, fails to make a decision within sixty (60) days after the appointment of the third arbitrator, new arbitrators may at the election of either party be chosen in like manner as if none had been previously selected.

5. The decision of the arbitrators shall be drawn up in writing and signed by the arbitrators or a majority of them, and shall be final and binding on the parties hereto as to any question or questions submitted, and the parties hereto shall abide by such decision and perform the conditions thereof. All expenses in connection with such arbitration, including a reasonable compensation to the arbitrators, shall be divided equally between the parties hereto, with the exception of the expenses of counsel, witnesses and employees of the parties hereto, which will be borne by the party incurring them.

6. It is contemplated that arbitrators selected to act hereunder shall be qualified by education and training to pass upon the particular question in dispute. Therefore, it is agreed that if an engineering question is involved, qualified engineers shall be appointed; if a legal question is involved, qualified lawyers shall be appointed; and similar procedure shall be followed in connection with other questions.

IN WITNESS WHEREOF, the parties have caused this agreement to be duly executed by their proper corporate officers hereunto duly authorized and their corporate seals to be affixed, so as to be binding upon themselves and their respective successors and assigns.

ATTEST:

/s/ E. O'N. Johnson
Asst. Secretary

(seal)

SOUTHERN UNION GATHERING COMPANY

By /s/ J.C. Reid
Vice President

ASG

SELLER

ATTEST:

/s/ V.M. Plummer
Asst. Secretary

(seal)

EL PASO NATURAL GAS COMPANY

By /s/ D.H. Tucker
Vice President

BUYER

LAW OFFICES
OF
W. A. KELEHER
A. H. McLEOD
ATTORNEYS AND COUNSELLORS AT LAW
FIRST NATIONAL BANK BUILDING
ALBUQUERQUE, NEW MEXICO

W. A. KELEHER
A. H. McLEOD
J. C. RYAN
T. B. KELEHER
JOHN B. TITTMANN

MAIN OFFICE OCC
1954 MAY 10 AM 9:31

May 8, 1954

Oil Conservation Commission,
Santa Fe, New Mexico.

Attention: Mr. Spurrier

Gentlemen:

Herewith please find original and two copies of Motion for deferment and continuance until a later day of the hearing in Case No. 330, now scheduled for May 19th.

Thanking you for your kind cooperation, I am

Yours very truly,

WAK:rg
Encs.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
CONSIDERING:

THE APPLICATION OF STANOLIND OIL
AND GAS COMPANY FOR THE AMENDMENT
OF ORDER NO. R-110 RELATING TO THE
BLANCO-MESAVERDE POOL, SAN JUAN
AND RIO ARRIBA COUNTIES, NEW MEXICO.

CASE NO. 330
Order No. R-128-A

TO SAID HONORABLE COMMISSION:

Comes now PUBCO DEVELOPMENT, INC., one of the interested parties in the above entitled and numbered cause, and respectfully requests the vacation of the hearing heretofore set for May 19, 1954, and a resetting for June 19, 1954, for the following reasons:

1. That the operators to be affected by any Order of the Commission following a hearing on the merits are now, and have been for many weeks last past, in good faith assembling data and information so that the merits of the problems involved can be intelligently submitted to the Commission.

2. That there is reason to believe that by exchange and interchange of information and data the operators involved may be enabled to narrow the issues, and probably reach a stipulated agreement for submission to the Commission.

3. That since April 15, 1954, the date of the continuance to May 19, 1954, good progress has been made in the direction of solving the problem involved, affecting both the major operators and the independents.

4. That a deferment for several weeks will not prejudice the rights of any operators in the Basin, and may make it possible for the achievement of a harmonious settlement of the issues involved, requiring only brief testimony before the Commission to support a Commission Order.

WHEREFORE, the deferment and continuance herein prayed for are respectfully requested.

PUBCO DEVELOPMENT, INC.,

By _____
Attorney
First National Bank Building,
Albuquerque, New Mexico.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
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PUBCO DEVELOPMENT, INC.,

By (SIGNED) W. A. KELSHER
Attorney
First National Bank Building,
Albuquerque, New Mexico.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
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WHEREFORE, the deferment and continuance herein prayed for are respectfully requested.

PUBCO DEVELOPMENT, INC.,

By (SIGNED) W. A. KELEHER
Attorney
First National Bank Building,
Albuquerque, New Mexico.

LAW OFFICES
OF
W. A. KELEHER
A. H. McLEOD
ATTORNEYS AND COUNSELLORS AT LAW
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ALBUQUERQUE, NEW MEXICO

W. A. KELEHER
A. H. McLEOD
J. C. RYAN
T. B. KELEHER
JOHN B. TITTMANN

Case 330

April 1, 1954

Oil Conservation Commission
Santa Fe,
New Mexico

Attention: Mr. Spurrier

Gentlemen:

This refers to telephone conversation of even date herewith in regard to request for continuation of Case No. 330 from April 15 until a later date.

Enclosed herewith please find original and two copies of request for continuance beyond April 15. Kindly file, and advise me of any developments.

Thanking you, I am

Yours very truly,

WAK:of

Enc.

MAIN OFFICE OCC

1954 APR 3 AM 11:00

MAIN OFFICE OCC

1954 APR 3 AM 11:00

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
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CASE NO. 330
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THE APPLICATION OF STANOLIND OIL
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AND RIO ARRIBA COUNTIES, NEW MEXICO.

TO SAID HONORABLE COMMISSION:

Now comes PUBCO DEVELOPMENT, INC., one of the parties in interest in the above entitled and numbered cause, and respectfully moves that the hearing on this matter, heretofore set for hearing on April 15, 1954, be continued, and in support of such application respectfully shows:

1. That this Commission has heretofore requested the San Juan Basin Operators Association to recommend such proration formula for gas produced in the San Juan Basin as in the opinion of said Association is fair, just and equitable. To that end said Association has heretofore appointed a Subcommittee consisting of engineers and geologists who are employed by certain of its members who have substantial holdings in the San Juan Basin and such Committee has been diligently laboring in that connection.

2. That the problem presented is difficult and complex and has required and will require intensive study and research in order for such a formula to be finally agreed upon.

3. That such Committee feels that additional time is needed in connection with its study and work on said subject

and that in advance of a thorough study and review of such questions it would not be in the public interest or in the interest of conservation for such a formula to be promulgated by this Commission.

WHEREFORE, Pubco Development, Inc. prays that the hearing on the above entitled and numbered application be continued for such time as to the Commission shall seem just and proper in the premises.

Dated April 1, 1954.

PUBCO DEVELOPMENT, INC.

By _____
Its attorney,
First National Bank Bldg.
Albuquerque, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
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Dated April 1, 1954.

PUBCO DEVELOPMENT, INC.

By W. A. Keeler

Its attorney,
First National Bank Bldg.
Albuquerque, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION FOR THE PURPOSE OF
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TO SAID HONORABLE COMMISSION:

Now comes PUBCO DEVELOPMENT, INC., one of the parties in interest in the above entitled and numbered cause, and respectfully moves that the hearing on this matter, heretofore set for hearing on April 15, 1954, be continued, and in support of such application respectfully shows:

1. That this Commission has heretofore requested the San Juan Basin Operators Association to recommend such proration formula for gas produced in the San Juan Basin as in the opinion of said Association is fair, just and equitable. To that end said Association has heretofore appointed a Subcommittee consisting of engineers and geologists who are employed by certain of its members who have substantial holdings in the San Juan Basin and such Committee has been diligently laboring in that connection.

2. That the problem presented is difficult and complex and has required and will require intensive study and research in order for such a formula to be finally agreed upon.

3. That such Committee feels that additional time is needed in connection with its study and work on said subject

and that in advance of a thorough study and review of such questions it would not be in the public interest or in the interest of conservation for such a formula to be promulgated by this Commission.

WHEREFORE, Pubco Development, Inc. prays that the hearing on the above entitled and numbered application be continued for such time as to the Commission shall seem just and proper in the premises.

Dated April 1, 1954.

PUBCO DEVELOPMENT, INC.

By W. A. Keech
Its attorney,
First National Bank Bldg.
Albuquerque, New Mexico

Case 330

ALBUQUERQUE ASSOCIATED OIL COMPANY

FIRST NATIONAL BANK BUILDING
ALBUQUERQUE, NEW MEXICO

MAIN OFFICE OCC

1954 JUL 28 PM 2:41

DUDLEY CORNELL
PRESIDENT

July 27, 1954

The Oil Conservation Commission
State of New Mexico
State Capitol Building
Santa Fe, New Mexico

Re: Recommended Order, Case 330,
Proration - Blanco Mesa Verde
Field, New Mexico

Gentlemen:

Albuquerque Associated Oil Company does not operate in the Blanco Mesa Verde Field and has overriding royalty interest under more than thirty wells in the Field. For that reason, we are interested in a solution to the proration problem that will be fair to both large and small producers. We desire to go on record as believing that the formula of 75% of withdrawals based on deliverability times acreage and 25% of withdrawals based on acreage should be adopted by the Commission.

Very truly yours,

ALBUQUERQUE ASSOCIATED OIL COMPANY

BY DUDLEY CORNELL
President

DC:cr

Rclpl

SOUTHERN UNION GAS COMPANY
BURT BUILDING
DALLAS 1, TEXAS

FEB 8 1954

February 5, 1954

Oil Conservation Commission
Mabry Hall
Santa Fe, New Mexico

Gentlemen:

Pursuant to order R-128-A issued in case No. 330, we are herewith transmitting three copies of a summary of gas production from all Blanco-Mesaverde wells connected to Southern Union Gas Company and Southern Union Gathering Company lines. This production is reported by months and includes a yearly total for each well for the year 1953.

Yours very truly,

A. M. Wiederkehr

A. M. Wiederkehr
Reservoir Engineer

AMW:bg

cc: Mr. Art Hill
El Paso Natural Gas Co.
Houston, Texas

Mr. R. G. Hiltz
Stanolind Oil & Gas Co.
Ft. Worth, Texas

Mr. Jack Bowen
Delhi Oil Corporation
Dallas, Texas

Mr. Van Thompson
Aztec Oil & Gas Company
Dallas, Texas

Pubco Development Co.
P. O. Box 1360
Albuquerque, New Mexico

Mr. Kenneth Murchison
1315 Pacific
Dallas, Texas

Greenbrier Oil Co.
327 S. Adams
Ft. Worth, Texas

1953 Production Summary
Production by Months for Wells Connected
To Southern Union Systems

BLANCO FIELD

AZTEC OIL & GAS COMPANY

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Cain #3	170	102	0	3,609	0	0	0	0	3,929	2,154	2,667	3,887	16,518
Grenier #1-A	0	0	75	528	361	345	669	210	160	0	480	0	2,828
Alston #1	1,364	1,975	1,012	1,059	624	40	555	234	1,604	2,861	2,345	2,318	15,991
Calloway #1	7,490	8,419	3,010	596	3,983	749	249	351	352	2,093	7,702	5,936	40,930
Childers #1	24,966	24,148	25,012	9,947	18,768	1,906	1,647	1,926	3,970	8,775	9,130	27,937	158,132
Crandell #1	9,630	10,326	10,754	14,112	4,591	126	1,404	4,303	5,199	4,803	19,920	11,031	96,199
Lawson #1	38,976	35,077	37,928	11,222	21,606	4,094	4,159	1,834	3,800	6,641	13,229	43,724	222,290
Nye #1	2,137	1,783	1,722	836	618	22	644	719	1,360	2,557	1,786	1,681	15,865
Nye #3	1,628	1,599	1,838	700	552	20	417	539	902	1,752	1,592	1,373	12,912
Pierce #1	5,079	1,787	3,959	5,019	1,648	1,705	1,855	635	1,437	5,362	8,682	4,167	41,335
Pierce #2	4,959	3,194	1,861	4,647	732	345	569	514	3,937	2,315	7,435	4,185	34,693
Randelmon #1	9,856	17,178	10,672	2,307	13,148	3,297	962	1,275	9,286	4,370	20,752	14,108	107,711
Ruple #1-X	10,886	11,426	5,102	11,907	7,824	258	4,507	8,235	1,409	13,191	13,330	10,115	98,190
Vanderslice #1	9,469	6,879	7,578	1,805	4,854	4,671	1,586	1,484	1,694	4,384	7,473	5,389	57,266
Vanderslice #2	------	------	5,386	3,782	2,136	44	1,473	576	1,675	2,607	3,245	4,764	25,688
McCoy #1	21,113	20,235	20,233	12,970	12,113	140	17,347	24,764	19,588	24,811	17,342	18,712	209,368
Turner #1	------	------	------	4,297	1,039	563	89	0	0	0	0	351	6,339
Chamberlain #1	8	266	294	798	252	9	16	21	393	376	479	747	3,659
Culpepper-Martin #1	8,796	5,193	2,787	0	4,728	2,490	203	115	182	1,626	2,814	3,907	32,841
Culpepper-Martin #3	9,533	3,188	0	0	417	88	0	72	103	3,245	5,842	7,929	30,417
Culpepper-Martin #4	14,171	9,810	1,366	4,543	5,335	248	86	129	176	3,473	1,358	11,229	51,924
Culpepper-Martin #5	1,031	1,761	1,184	0	633	388	11	14	94	411	106	730	6,363
Davis #1	9,848	8,726	5,783	1,753	3,038	1,669	0	84	80	0	5,961	64	37,006
Davis #2	6,402	4,131	3,003	168	2,094	1,269	0	73	4,399	1,820	50	7,357	30,766
Davis #3	6,856	6,636	1,250	120	1,777	1,349	54	60	50	2,911	1,785	436	23,284
Davis #4	16,124	14,703	4,006	4,814	2,717	4,126	151	128	106	9,250	12,826	2,366	71,317
Davis #5	5,373	4,020	1,030	69	287	258	37	28	29	1,433	0	1,161	13,725
Davis #6	1,705	3,031	1,636	1,174	1,162	677	61	0	86	496	2,743	750	13,521
Decker #1	3,784	2,696	2,368	0	1,321	32	40	44	1,728	1,669	117	1,557	15,356
Decker #1-A	2,946	1,250	1,259	918	286	33	15	24	58	282	340	813	8,224
Dusenbery #1	10,988	7,752	12,609	7,992	3,810	1,663	72	78	1,734	15,376	6,143	7,912	76,129

AZTEC OIL&GAS COMPANY - Continued

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
East #1	1,301	14,403	18,189	10,614	5,183	53	63	31	465	0	16,671	4,105	71,078
East #2	4,253	2,480	1,893	169	756	97	58	54	78	73	4,148	1,990	16,049
Grenier #1	15,938	11,684	12,792	5,257	2,767	3,438	109	81	105	4,549	155	5,758	62,633
Grenier #2	3,190	2,836	1,907	2,516	1,225	699	36	27	38	909	2,999	372	16,754
Grenier #3	341	0	0	0	0	0	0	0	135	9,764	3,240	4,751	18,231
Grenier #4	23,381	43,260	48,945	28,738	14,003	11,727	618	408	407	31,089	11,932	34,579	249,087
Harper #1	6,272	1,919	1,493	90	0	0	0	0	875	9,000	2,301	3,687	25,637
Hubbard #1	2,862	2,244	1,379	3,060	1,547	82	294	107	964	2,901	5,022	1,635	22,097
Hubbard #2	1,790	0	469	786	0	0	542	169	76	665	48	317	4,862
Richardson #1	18,494	16,077	16,998	8,909	5,469	96	196	127	987	16,678	17,674	6,377	108,082
Richardson #2	1,868	3,901	2,667	3,363	1,643	182	35	759	93	51	1,492	1,256	17,310
Richardson #3	5,032	2,128	2,595	1,410	1,006	43	528	54	52	80	263	307	13,498
Richardson #4	9,207	6,561	6,336	2,358	2,145	1,484	112	42	38	1,975	178	6,438	36,874
Thompson #1	967	478	1,050	1,024	352	0	28	14	428	703	868	137	6,049
Thompson #2	2,468	1,332	1,158	489	446	17	12	26	20	635	269	1,708	8,580
Thompson #3	2,053	1,544	1,171	504	664	45	23	23	55	583	280	1,253	8,198
Thompson #4	1,290	854	938	581	365	64	20	17	30	1,175	37	859	6,230

DELHI OIL COMPANY

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Bradley #1-X	1,035	1,076	0	2,142	1,731	1,233	1,790	1,455	1,364	2,847	1,519	685	16,877
Florence Federal #1-3	55,809	22,544	12,863	44,435	15,048	20,283	6,072	30,851	20,949	32,421	61,056	52,386	374,737
Florence Federal #1-4	20,543	14,801	10,817	6,674	8,303	5,403	3,533	10,976	0	10,860	13,170	10,206	115,286
Florence Federal #1-5	27,755	41,862	9,524	11,129	44,680	21,900	19,093	25,085	4,770	39,350	51,221	47,300	343,669
Florence Federal #1-6	8,841	5,237	3,010	6,155	2,671	3,269	2,882	4,038	1,606	6,575	4,133	2,408	50,825
Florence Federal #1-7	16,623	0	8,024	17,847	15,848	7,659	7,791	9,642	0	9,475	20,714	13,535	123,158
Florence Federal #1-13	7,517	4,279	3,017	6,366	3,614	4,337	5,266	4,679	5,257	1,464	3,062	4,479	53,337
Florence Federal #1-18	------	------	35,606	18,830	7,301	7,971	3,920	16,144	0	9,350	13,072	23,526	135,720
Florence Federal #1-19	0	31,992	8,478	14,881	11,811	14,097	9,331	17,970	0	15,650	16,427	28,197	168,834
Florence Federal #1-24	32,030	5,785	5,567	15,081	15,906	12,202	7,824	8,020	4,238	23,283	19,830	20,221	169,987
Florence Federal #1-25	9,986	9,302	5,919	2,796	3,911	1,911	2,176	2,727	1,170	6,387	6,450	6,196	58,931
Florence Federal #1-25	2,639	3,859	3,893	1,762	1,760	1,379	2,646	1,303	1,213	1,082	2,156	2,163	25,855
Florence Federal #2-37	46,081	14,648	16,539	7,265	10,054	10,835	24,360	8,669	18,465	16,689	19,195	33,798	226,598
Florence Federal #1-38	------	------	------	------	------	------	------	------	------	------	------	3,846	3,846

DELHI OIL COMPANY - Continued

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Florence Federal #1-39	------	------	------	------	------	------	------	------	------	------	------	13,912	13,912
Florence Federal #2	39,709	32,590	30,884	10,269	15,408	5,756	13,071	13,115	30,605	11,504	37,759	42,035	282,705
Florence Federal #2-9	0	3,610	6,833	3,102	11,834	9,526	6,699	4,345	2,404	3, 094	16,740	6,095	74,282
Florence Federal #2-10	10,912	7,888	2,850	3,194	5,455	2,005	3,848	2,975	941	4,841	7,247	6,847	59,003
Florence Federal #2-14	23,038	20,154	13,863	9,759	14,456	9,728	5,470	15,697	16,336	7,317	25,799	25,859	187,476
Florence Federal #2X-16	44,710	22,687	10,357	14,982	16,201	17,122	9,348	15,207	0	14,699	21,832	32,857	220,002
Florence Federal #2-23	0	0	3,571	5,248	6,288	2,579	6,405	2,087	2,964	4,403	2,253	5,130	40,928
Florence Federal #2-27	11,973	6,719	5,805	1,782	4,361	3,097	5,530	5,257	7,347	2,487	2,868	9,669	66,895
Florence Federal #2-30	------	------	------	------	------	------	------	------	------	------	------	5,543	5,543
Florence Federal #2-41	16,856	10,064	0	1,158	12,257	6,334	15,652	7,902	17,742	6,741	19,329	24,785	138,820
Florence Federal #3-8	14,312	13,383	10,867	8,923	11,132	7,888	6,266	7,392	6,413	9,083	8,876	11,717	116,252
Florence Federal #3-29	------	------	------	------	------	------	------	------	------	------	------	7,130	7,130
Florence Federal #3-42	0	0	1,706	817	3,212	1,223	2,355	2,040	2,120	4,844	5,240	2,240	25,798
Giomi #1	24,781	20,896	19,339	7,479	12,357	4,816	9,018	9,995	6,609	19,676	16,986	23,249	175,201
Hammer #1	2,858	3,595	0	2,271	2,629	1,534	1,021	1,642	0	2,597	2,316	5,206	25,669
Jackson #1	------	5,042	4,014	0	2,631	1,521	1,751	1,125	1,026	822	2,639	2,577	23,148
Mansfield #1	8,029	7,212	836	2,246	5,307	4,806	7,544	6,183	4,459	1,857	3,385	7,106	58,970
Moore #1	2,713	6,901	5,344	4,035	2,743	2,679	5,449	2,896	2,664	3,218	5,429	4,254	48,325
Nye #1	------	------	------	------	------	------	------	------	------	------	1,881	0	1,881
Pritchard #1	26,441	23,718	27,460	8,082	7,841	10,330	9,722	6,081	0	3,401	15,604	29,674	168,354
Pritchard #2	167,343	139,465	113,302	11,092	26,066	38,444	35,668	19,992	40,462	52,689	62,137	140,001	846,661
Pritchard #1-3	------	------	------	------	------	------	------	------	------	------	------	9,281	9,281
Riddle #1	51,191	11,559	17,110	13,257	15,287	5,121	13,471	17,517	6,926	33,151	51,733	49,842	292,165
Riddle #2	30,835	27,062	25,166	12,587	7,129	6,420	10,013	15,441	23,432	21,324	24,777	29,421	233,607
State #1	0	7,349	9,904	3,624	2,689	4,738	4,548	4,233	3,273	5,453	9,359	8,178	63,348
State #2	0	8,772	13,004	8,045	3,880	6,692	15,233	6,509	13,044	10,281	13,678	12,257	111,395
State #3	20,344	17,650	13,193	5,861	14,497	7,640	1,895	10,583	12,814	7,682	18,792	14,970	145,921
M.J. FLORENCE													
Florence #1	------	------	------	------	------	------	------	------	------	------	807	4,025	4,832

GREENRIER OIL COMPANY

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Federal-Lawson #1	9,361	9,405	10,205	8,043	8,502	4,634	5,972	4,443	9,485	10,906	6,587	4,241	92,284
State-Day #1	33,175	18,753	12,430	25,543	22,099	15,537	17,069	21,150	17,914	8,566	23,405	29,082	244,723
Federal-Vasaley #1	11,696	9,962	8,736	9,272	9,413	9,609	12,095	11,069	11,310	11,018	4,638	4,578	113,401
JOHNSON													
~~J.D. HUDSON~~													
Culpepper-Martin #1	4,138	2,193	1,271	2,171	1,421	41	49	61	1,420	1,227	873	3,439	18,304
MURCHISON													
Horton #1	7,377	6,893	743	644	5,094	1,571	3,175	2,847	4,456	5,364	5,677	0	44,341
Storey #1-E	30,866	29,569	30,029	28,860	28,329	20,103	16,438	26,354	30,268	15,739	27,004	23,375	306,934
Horton #2	4,931	9,433	7,477	11,598	10,641	11,475	12,030	8,975	11,610	7,607	9,583	8,652	114,062
PUBCO													
State #1-X	-----	-----	-----	-----	-----	-----	-----	-----	-----	6,586	5,058	0	11,644
State #2	13,811	13,698	8,932	9,760	8,893	10,901	8,358	5,348	13,789	9,201	7,254	11,671	121,615
State #3	16,840	17,057	15,510	5,708	15,326	14,294	17,587	17,754	15,253	12,069	12,758	16,633	177,289
Primo #1	-----	-----	-----	-----	-----	11,531	1,517	3,718	15,381	21,007	15,731	40,061	108,946

SOUTHERN UNION GAS COMPANY

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Hunsaker #1	-----	689	16,689	12,380	6,235	9,712	4,242	3,760	5,705	11,545	6,147	11,634	88,783
Hunsaker #2	-----	-----	-----	-----	-----	-----	-----	-----	55,297	127,151	68,754	119,832	371,034
Mims-State #1	-----	-----	-----	-----	-----	5,251	13,151	5,139	2,078	2,159	1,819	7,095	36,692
Nordhaus #1	-----	169	3,829	2,997	657	1,385	603	755	957	477	1,508	901	11,238
Oonard #1	-----	-----	-----	1,725	2,792	4,753	3,026	1,482	1,801	2,091	21	1,715	19,421
Quinn #1	-----	-----	38,680	14,144	6,514	11,159	11,276	6,270	10,192	6,276	21,171	32,178	157,560
Seymour #1	-----	1,204	38,638	17,123	12,342	9,942	5,983	7,953	15,221	5,830	12,820	15,500	142,556
Seymour #2	-----	-----	-----	-----	-----	-----	-----	-----	17,586	24,129	25,132	30,762	97,609
Seymour #3	-----	-----	-----	-----	-----	-----	-----	-----	4,236	8,470	2,389	0	15,595

SOUTHERN UNION GAS COMPANY - Continued

Well Name & Number	Jan. MCF	Feb. MCF	Mar. MCF	Apr. MCF	May MCF	June MCF	July MCF	Aug. MCF	Sept. MCF	Oct. MCF	Nov. MCF	Dec. MCF	Total MCF
Bruington #1	------	------	------	6,598	3,224	205	1,696	1,397	4,050	16,071	11,809	20,662	65,712
Harrison #1	3,225	3,348	15,749	23,048	14,215	3,444	1,757	2,050	2,284	7,869	14,102	35,940	127,031
Page #1	19,234	15,398	14,954	5,224	6,256	5,476	2,346	3,092	2,247	4,653	6,159	13,775	99,314
Primo Mudge #1	2,977	17,470	18,148	6,566	5,875	122	140	5,422	5,509	9,518	15,261	19,509	106,517
Wilmuth #1	------	------	------	1,079	1,959	71	44	282	1,554	0	0	0	4,989
Dalsant #1	4,550	6,129	2,366	633	693	613	68	39	44	2,937	4,749	3,695	26,516
Hillstrom #1	------	------	------	------	------	------	------	------	8,135	17,246	401	3,719	29,501
Moore #1	------	------	------	------	------	------	------	------	2,638	4,923	0	4,178	11,739
Patterson #1	------	------	------	------	------	------	25,821	5,455	166	14,412	8,607	22,409	76,870

EXECUTIVE COMMITTEE OFFICERS
FRANK BARNES, Chairman
Consultant [redacted]
F. P. CRUM, Vice Chairman
J. D. Hancock & Co.
TOM BOLACK, Sec.-Treas.
Independent

San Juan Basin Operators Committee
211½ WEST MAIN STREET
FARMINGTON, NEW MEXICO

EXECUTIVE COMMITTEE MEMBERS
AL GREER, JR., Benson-Montin
W. T. HOLLIS, El Paso Natural Gas Co.
J. B. HOWELL, Delhi Oil Corp.
CLAUDE TEEL, Skelly Oil Co.
D. LOOS, Blackwood-Nichols
G. W. R. HOY, Attorney

May 18, 1954

Oil Conservation Commission
Santa Fe, New Mexico

Gentlemen:

Enclosed herewith is an outline of the work accomplished by the Engineering Subcommittee of the San Juan Basin Operators Committee in regard to gas proration in the Mesaverde formation of the San Juan Basin of northwestern New Mexico. An executive session of the San Juan Basin Operators Committee, as a whole, was held May 18, 1954. A report of the sub-committee was reviewed, amended and adopted by this committee and is enclosed with this letter.

At the meeting today of the San Juan Basin Operators Committee, there appeared to be a desire of the majority to compromise on a proration formula of 75% deliverability times acreage plus 25% acreage. However, there was a minority present who was not in agreement with this formula.

The San Juan Basin Operators Committee has not taken any stand for or against the proration of natural gas in the Mesaverde reservoir in the San Juan Basin. Any such position will have to be taken by the individual members and any testimony for or against proration would also have to be submitted by the individual members.

Because of the scope of this study, the operators committee hereby recommends that all proration hearings be heard on a separate day and not as a part of the monthly hearings, in order that there will be no interruption or interference with the testimony presented and this date be set not sooner than 30 days from today. This will also allow more adequate time to combine data, and provide the members an opportunity to prepare additional and more complete data to present to the Commission.

We sincerely hope that the enclosed data will be of assistance to the Commission to consider the problems of proration.

Respectfully submitted,

SAN JUAN BASIN OPERATORS COMMITTEE

Frank C Barnes

FCB:BW

By FRANK C. BARNES, Chairman

SAN JUAN BASIN OPERATORS COMMITTEE
Farmington, New Mexico

Subject: Report of the Engineering Sub-Committee on Allocation of Production to Gas Wells, San Juan Basin

To the Members of the
Oil Conservation Commission
Santa Fe, New Mexico

At a meeting of the San Juan Basin Operators Executive Committee held November 30, 1953, an Engineering Sub-Committee was appointed to study the effect and feasibility of rateable take of gas in the San Juan Basin. This Committee has held four meetings.

A report outlining the results achieved at these meetings follows. In the interest of achieving some measure of clarity, this report is divided as indicated below.

I. The Committee: Its purpose and business.

II. Scope of Study.

III. Characteristics of the Blanco Mesa Verde Reservoir.

IV. Type of Allocation Formulae considered.

V. Minimum and Maximum Allowables.

VI. Specific Formulae, Agreements and Compromises.

I. THE COMMITTEE: ITS PURPOSE AND BUSINESS

Five members were appointed by the Executive Committee to comprise the engineering sub-committee. These were:

Frank Barnes, Independent Geologist
Scott R. Brown, Western Natural Gas Company
Truitt Hollis, El Paso Natural Gas Company
Fred P. Crum, Jr., J. D. Hancock & Co. Ltd.
Albert R. Greer, Benson-Montin

Because of the general interest to all San Juan Basin producers, the meetings were open to any operator who desired to be represented, and those attending were also considered the same as members of the sub-committee. The meetings were well attended and in general considerable interest was shown by the members.

At the first meeting, the sub-committee concluded that the first order of business should be an attempt to devise an allocation formula suitable to the San Juan Basin and, if possible, acceptable to all the operators.

The committee, as such, had no authority designated it by the Oil Conservation Commission, nor was it empowered to vote for, or on behalf of, the San Juan Basin Operators Committee. It was merely an engineering sub-committee, which studied methods of gas allocation and which was obligated to report its findings to the Executive Committee. The general intent and purpose being that perhaps a formula could be devised which would be acceptable to most of the operators and perhaps could be recommended by the San Juan Basin Operators Committee, as a whole, to the Oil Conservation Commission.

II. SCOPE OF STUDY

It was generally agreed that the committee should devote its study to the determination of an allocation formula to distribute production among wells within a pool. The committee's thoughts relative to pool nominations and methods of handling over and under production and allowable schedules were that these matters should be left to the Oil Conservation Commission and the pipe line companies.

At the first meeting, the committee planned to study formulae for both the Blanco Mesaverde field and the Pictured Cliffs fields. Some of the general characteristics, which may affect proration, differ between the Blanco Mesaverde and the Pictured Cliffs fields. Although the same type formula may apply to both formations, the differences should be considered. Among other things, these differences are: (1) The Blanco Mesaverde has been developed on a fairly uniform pattern of 320 acres per well, whereas the Pictured Cliffs fields have been developed under spacing regulations varying from 40 acres to 320 acres per well. (2) The Mesaverde has been developed over a comparatively small interval of time, whereas the Pictured Cliffs development in one field has been continued for over thirty years. (3) Initial shut-in pressure differences in the Blanco Mesaverde show a limited range approximating 100#, whereas initial shut-in pressures of Pictured Cliffs wells vary from approximately 500# to about 1000#, and some wells which are currently being completed in the old fields have initial shut-in pressures as low as 300#.

Since the Mesaverde is the larger producer, the committee decided to work on it first. Inasmuch as the Oil Conservation Commission has a hearing scheduled in May for proration in the Blanco Mesaverde field, the sub-committee at its fourth meeting felt compelled to complete its work on this field, and it has not found time to make a separate study, as such, of the Pictured Cliffs fields.

In view of the foregoing, the committee's work and this report are therefore limited to the study of an allocation formula distributing production to wells within the Blanco Mesaverde pool.

III. CHARACTERISTICS OF THE BLANCO MESAVERDE RESERVOIR

It is not the intent of this section to present a reservoir study of the Mesaverde formation, but to point out some of the factors and opinions, part of which are controversial, but all of which affected the opinions of the members relative to a proration formula.

A. Sands open to production: In the area considered, the Mesaverde formation can be divided into three generally traceable members, which are the Cliff House, the Menefee, and the Point Lookout. The Point Lookout is thought to be the primary productive sand in most areas, and is the sole sand open to production in some parts of the field. In other parts of the field all three members are open to production.

For practical purposes of production the entire Mesaverde formation has been considered by the Oil Conservation Commission as a common source of supply. However, where it is productive, and open to the well bore, the Cliff House contributes gas to production in addition to that which might have been obtained from the Point Lookout alone. Some of the members of the committee also voiced the opinion that in some wells the Menefee is productive. In some parts of the field, then, production from any one well may be from more than one zone of the reservoir.

B. Core Data: The committee did not have the time to make a study of core analyses, or attempt correlations of core analyses with logs. Very little time was spent reviewing core data.

C. Range of Productivity: A considerable variation in productivity exists, not only by areas, but in offset wells. This gives rise to the question that a well's productivity may or may not truly reflect the average sand conditions under its tract.

D. Degree of Communication: No interference tests were made available to the sub-committee. Agreement among committee members was not reached as to degree of communication that exists between wells. Some held the opinion that the large wells were draining areas considerably in excess of 320 acres. Others held the opinion that no communication exists over areas greater than the 320 acres assigned to each well.

E. Relation of Productivity to Reserves: Discussions relative to formulae suggested inevitably ended in the controversial question of the relation of well productivity to reserves under its tract. Some of the members expressed the opinion that the unusually large wells resulted from a fractured condition, and as such, whatever relation might elsewhere in the field exist between productivity and reserves would not hold for the unusually large wells. Others stated the opinion that these high capacity wells resulted from thicker and better sand bodies.

IV. TYPE OF ALLOCATION FORMULAE CONSIDERED

A. The Kansas-Hugoton Formula: This formula is deliverability times acreage, in which the deliverability is measured at 80% of the field average shut-in pressure. This formula purports to equalize pressures in a field through the measurement of deliverability against a relative high back pressure, which is determined as a field average. Some members of the committee who have had experience with this formula reported that it does tend to equalize pressure, and hence, withdrawals, but is effective only on a regional, or areal, basis; and does not protect small wells against high productivity offsets. Also, this formula would have a very drastic effect in reducing allowables of low pressure wells. For these two reasons, the committee decided against use of deliverability as defined in the Kansas-Hugoton proration order.

B. Exponential Type Formula: There is considerable merit to an exponential type formula (acres times deliverability raised to a power less than 1) which can be developed analytically for any field where adequate core data is available. The committee, however, felt that it did not have the time, and perhaps not enough core data to be representative, to develop a formula of this type, so no effort was made to develop an exponential type formula.

C. Additive Type Formula: A formula in which there are two additive factors, namely acreage and deliverability, was considered by the committee as one having the best possibilities of permitting the committee members to reach agreement.

V. MINIMUM AND MAXIMUM ALLOWABLES

Some of the members thought that a minimum allowable should be one of the requirements of the allocation formula and that the formula should, in itself, provide the minimum allowable; or, if not provided for in the formula, then the minimum allowable should be separately specified. Full agreement was never reached on this issue. Qualified agreement was obtained in connection with one of the formulae, as later discussed herein. The member suggesting the minimum allowable originally recommended a figure of 400 MCF/day. Those opposing a minimum allowable never agreed to more than 250 MCF/day and this was in conjunction with a compromise formula only.

As used herein, the members define "minimum allowable" to be some particular rate of production from a well, below which that well will not be restricted in production rate by proration formula. This minimum allowable, however, must not exceed the well's deliverability as determined by the Oil Conservation Commission.

At the last sub-committee meeting, a maximum allowable of 5,000 MCF/day was suggested. This was the first meeting that this thought was introduced and, consequently, the sub-committee has not discussed its merits or drawbacks as fully as the minimum allowable.

VI. SPECIFIC FORMULAE, AGREEMENTS AND COMPROMISES

The committee agreed that possibility of reaching a unanimous approval of one formula by the Operators Committee would be best if it were composed of two additive factors as follows:

(1) "Deliverability" times "Acreage"
plus
(2) "Acreage"

in which "Deliverability" is the individual well's deliverability as determined by the method now in use in the San Juan Basin. For new wells which have not been tested, their deliverabilities and allowables would be estimated. The allowable so estimated would be subject to correction at such time as the well is tested and its true deliverability determined, and appropriate over or under production would be calculated and proper adjustment made in future allowables.

"Acreage" would be 320 acres for each well, unless the Conservation Commission has approved assigning it less than 315 acres or more than 325 acres.

It was agreed that the weight given to deliverability should be in the range of 50% to 100% of the formula, and the weight given to acreage should be between 50% and 0%.

In the above form, three specific formulae were recommended by various members. These were as follows:

1. 100% deliverability times acreage plus 0% acreage.

2. 50% deliverability times acreage plus 50% acreage.

3. 75% deliverability times acreage plus 25% acreage.

Those members supporting Formulae 1 and 2 could not agree on an "in-between" formula which they would recommend on an engineering basis. An attempt, however, was made to reach a compromise by the use of the third formula and applying a minimum allowable which would be subject to possible correction and review by the Oil Conservation Commission

It appeared that those members present at the fourth sub-committee meeting might finally agree upon the compromise formula, being 75% deliverability times acreage plus 25% acreage, and by setting a minimum allowable. ~~The qualifications to complete agreement by the sub-committee in the use of this formula as a compromise were with respect to the amount of the minimum and maximum allowables~~. FCB.

In conclusion, the sub-committee did not feel that it was in a position to make a definite recommendation as to a proration formula that could, in turn, be recommended to the Oil Conservation Commission in regard to the Blanco Mesaverde reservoir.

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Frank C Barnes
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San Juan Basin Operators Committee

Tom Bolack
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