Case 4750: Application of [redacted] for creation of new pool and for special rules for MORROW gas production.

ase No.

2750

plication, Transcript,

mall Exhibits, Etc.

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

February 13, 1967

Re: Case No. 2749 & 2750
Order No. R-2440-A & R-2441-A
Applicant:

RALPH LOWE

Mr. Terrell Couch
Marathon Oil Company
Post Office Box 3128
Houston, Texas

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC
Other Jason Kellahin, J. B. Jordan, Ivan Geddie, George Ford, Fred Goodman, W. C. Sturdivant and Robert Enfield

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 No. 2750
Order No. R-2441-A

APPLICATION OF RALPH LOWE
TO CREATE A NEW POOL FOR
MORROW GAS PRODUCTION AND
FOR SPECIAL POOL RULES,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 8, 1967, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 13th day of February, 1967, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2441, dated February 28, 1963, Special Rules and Regulations were promulgated for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year from the date of first pipeline connection.

(3) That pursuant to the provisions of Order No. R-2441, this case was reopened to allow the operators in the subject pool to appear and show cause why the Indian Basin-Morrow Gas Pool should not be developed on 320-acre spacing units.

(4) That the evidence establishes that one well in the Indian Basin-Morrow Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2441 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2441 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Indian Basin-Morrow Gas Pool, promulgated by Order No. R-2441, are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

PHONE MU 2-5281
RESIDENCE MU 2-1736

CURTIS R. INMAN
BOX 737
MIDLAND, TEXAS 79701

February 3, 1967

Marathon Oil Company
P. O. Box 3128
Houston, Texas 77001

Attention: Mr. J. O. Terrell Couch
Division Attorney

NMOCC Case Nos. 2749 & 2750 (Reopened) - Indian Basin Upper Penn Gas Pool and Indian Basin Morrow Gas Pool, Eddy County, New Mexico - (Feb. 8, 1967 Hearings for Permanent Order on Spacing Units)

Gentlemen:

I will be unable to be present nor will I have a representative present at the February 7, meeting or at the hearings called by the New Mexico Oil Conservation Commission February 8, 1967, in Santa Fe, New Mexico in Case Nos. 2749 & 2750. I am in agreement that 640-acre spacing units should be made permanent in both cases and this letter is your authority to so advise the Commission that that is my position.

My daughter, Miss Sally Inman, who has recently married and whose name is now Mrs. Sally Inman Kelly, concurs with the above views and hereby authorizes you to take the same position with the Commission in regard to the spacing units.

Yours very truly,

Curtis R. Inman

CURTIS R. INMAN

CRI:ef

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION
TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

(50).

SYMBOLS
DL = Day Letter
NL = Night Letter
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LA062 DA138

1967 FEB 7 AM 11 20

D MDA079 PD 1 EXTRA=MIDLAND TEX 7 1142A CST=
NEW MEXICO OIL CONSERVATION COMMISSION=
SANTAFE NMEX=

RE CASE 2749 AND CASE 2750 WE WISH TO RECOMMEND THAT 640 ACRE SPACING BE MADE PERMANENT IN EACH POOL=
REDFERN DEVELOPMENT CORPORATION JOHN J REDFERN, JR., PRESIDENT=

'67 FEB 7 PM 2 31

=2749 2750 640.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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WESTERN UNION
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(23).

LA129 DA342

1967 FEB 7 PM 3 40

B MDA134 PD 4 EXTRA=WUX MIDLAND TEX 7 421P CST=
NEW MEXICO OIL CONSERVATION COMMISSION=
ATTN MR A L PORTER JR SANTAFE NMEX=

IN RE CASE NO. 2749 ON FEBRUARY 8, 1967, SHELL OIL COMPANY AS WORKING INTEREST OWNER IN THE INDIAN BASIN FIELD, RECOMMENDS THAT THE 640 ACRE SPACING UNITS FOR THE INDIAN BASIN - UPPER PENNSYLVANIAN GAS POOL GRANTED BY ORDER NO. R-2440 BE MADE PERMANENT.
IN CASE NO. 2750 ON FEBRUARY 8, 1967, SHELL OIL COMPANY AS WORKING INTEREST OWNER IN THE INDIAN BASIN FIELD, RECOMMENDS THAT THE 640 ACRE SPACING UNITS FOR THE INDIAN BASIN - MORROW GAS POOL GRANTED BY ORDER NO.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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R-2441 BE MADE PERMANENT=

J E R SHEELER PRODUCTION MGR WESTERN DIV

MIDLAND TEXAS=

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LA045 SE055 (00)=

L RWA017 PD=ROSWELL NMEX 6 950A MST=
:NEW MEXICO OIL CONVERSATION COMMISSION 1967 FEB 6 AM 10 10

ATTN A L PORTER STATE LAND OFFICE BLDG SANTA FE NMEX=

REFERENCE YOUR DOCKT NUMBER 4-67-CASE NUMBER 2750 AND CASE NUMBER 2749 AS WORKING INTEREST OWNERS IN THE INDIAN BASIN UPPER PENN AND/OR MORROW GAS POOLS, WE CONCUR WITH THE TESTIMONY AS PRESENTED BY MARATHON OIL CO ON 2/8/67 RELATIVE TO THE ABOVE CASES WE FAVOR AN ORDER PROVIDED FOR PERMANENT 640 ACRE SPACING UNITS IN BOTH CASES=

HANAGAN PETROLEUM CORP ROBERT G HANAGAN
HUGHE E HANAGAN ELLIS HNULIK ESTATE OF L T LEWIS
AND ESTATE NELLIE C LEWIS NEW MEXICO WESTERN MINERALS

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INC T T SANDERS JR J P WHITE JR PHELPS WHITE TOM D WHITE=

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LA214 DA286

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1967 FEB 6 PM 5 37

D MDA162 PD 2 EXTRA=MIDLAND TEX 6 40P CST=

NEW MEXICO OIL CONSERVATION COMM= 67 FEB 7

ATTN DANIEL S NUTTER SANTAFE NMEX=

SINCLAIR OIL AND GAS CO AS A SUBSTANTIAL WORKING INTEREST OWNER IN THE INDIAN BASIN UPPER PENNSYLVANIAN GAS POOL AND THE INDIAN BASIN MORROA GAS POOL EDDY [redacted]TY NEW MEXICO JOINS MARATHON OIL COMPANY IN RECOMMENDING PERMANENT 640 ACRE GAS PRORATION UNITS FOR THESE POOLS. THIS MATTER IS SCHEDULED FOR HEARING FEB 8 1967 CASES 2749 AND 2750=

R E POWERS ENGR SPVR SINCLAIR OIL AND GAS=

L=640 8 1967 2749 2750.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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WESTERN UNION
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LA215 DA289

B MDA163 PD=FAX MIDLAND TEX 6 411P CST= 1967 FEB 6 PM 6 38

A L PORTER JR, NM OIL CONSERVATION COMM=

STATE LAND OFFICE BLDG SANTAFE NMEX=

WITH REFERENCE TO CASE 2749 REOPENED AT EXAMINER HEARING FEBRUARY 8, 1967, TEXACO INC. RECOMMENDS RULES ESTABLISHED FOR INDIANBASIN UPPER PENN GAS POOL, EDDY COUNTY, NEW MEXICO, BY ORDER R2440 BE MADE PERMANENT=

67 FEB 7 AM 9

J W MARKLEY DIVISION MANAGER=

=2749 8 1967 R2440=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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WESTERN UNION
TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

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LA036 DA084

DTNA005 PD=TN DALLAS TEX 7 919A CST= 1967 FEB 7 AM 9 34

STATE OF NEW MEXICO=

OIL CONSERVATION COMMISSION=BOX 2088=SANTE FE, NMEX=

ATTN: MR A L PORTER, JR.=

REFERENCE TO NEW MEXICO OIL CONSERVATION COMMISSION CASES NO 2749 AND 2750 (REOPENED), INDIAN BASIN UPPER PENN GAS POOL AND INDIAN BASIN MORROW GAS POOL, EDDY COUNTY, NEW MEXICO , TEXAS PACIFIC OIL COMPANY, AS A WORKING INTEREST OWNER SUPPORTS MARATHON OIL COMPANY AND RESPECTFULLY URGES THE PERMANENT ADOPTION 640-ACRE SPACING UNITS FOR EACH FIELD.=

CC: MARATHON OIL COMPANY=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
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WESTERN UNION
TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

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BOX 3128=
HOUSTON, TEXAS 77001 ATTN: MR J O TERRELL COUCH=
RON FREELS, P E STAFF PRORATION ENGINEER==

2749 2750 640 3128 77001=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
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WESTERN UNION
TELEGRAM (15).

W. P. MARSHALL, PRESIDENT

1201 (4-60)

SYMBOLS
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LA023 NSB036 1967 FEB 7 AM 8 38

NS NSE007 PD=FAX HOUSTON TEX 7 839A CST=
J O TERRELL COUCH, DIVN ATTORNEY MARATHON OIL CO=
CARE LA FONDA HOTEL SANTA FE NMEX=

MONSANTO COMPANY, AS AN OPERATOR IN THE INDIAN BASIN UPPER PENN GAS POOL AND THE INDIAN BASIN MORROW GAS POOL, EDDY COUNTY, NEW MEXICO, CONCURS IN THE RECOMMENDATION OF MARATHON OIL COMPANY TO THE NEW MEXICO OIL CONSERVATION COMMISSION IN CASES NUMBER 2749 AND 2750, THAT THE ESTBALISHMENT OF 640-ACRE SPACING UNITS SHOULD BE MADE PERMANENT.=

YOU ARE AUTHORIZED TO GIVE THIS ADVICE TO THE

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION
TELEGRAM

W. P. MARSHALL, PRESIDENT

1201 (4-60)

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COMMISSION AT THE HEARING TO BE HELD ON FEBRUARY 8, 1967, AND IT WILL BE APPRECIATED IF YOU WILL DO SO=

MONSANTO CO BY F A GOERNER DIRECTOR OF PRODUCTION=

:=2749 2750 640 8 1967=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

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 No. 2749
Order No. R-2440-A

APPLICATION OF RALPH LOWE
TO CREATE A NEW POOL FOR
UPPER PENNSYLVANIAN GAS
PRODUCTION AND FOR SPECIAL
POOL RULES, EDDY COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 8, 1967, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 13th day of February, 1967, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2440, dated February 28, 1963, Special Rules and Regulations were promulgated for the Indian Basin-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year from the date of first pipeline connection.

(3) That pursuant to the provisions of Order No. R-2440, this case was reopened to allow the operators in the subject pool to appear and show cause why the Indian Basin-Upper Pennsylvanian Gas Pool should not be developed on 320-acre spacing units.

(4) That the evidence establishes that one well in the Indian Basin-Upper Pennsylvanian Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2440 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2440 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Indian Basin-Upper Pennsylvanian Gas Pool, promulgated by Order No. R-2440, are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

S E A L

esr/

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 8, 1967

EXAMINER HEARING

IN THE MATTER OF:

Case 2750 reopened pursuant to the provisions of Order No. R-2441, which order established 640 acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico

Case 2749 reopened pursuant to the provisions of Order No. R-2440, which order established 640 acre spacing units for the Indian Basin Upper Pennsylvanian Gas Pool, Eddy County, New Mexico

Case 2750
2749

BEFORE:

DANIEL S. NUTTER, Examiner

Transcript of Hearing

MR. NUTTER: We will call Case 2750.

MR. HATCH: Case 2750, reopened. In the matter of Case 2750 being reopened pursuant to the provisions of Order No. R-2441, which order established 640 acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year after the first pipe line connection in the pool.

MR. COUCH: Terrell Couch, appearing for Marathon Oil Company. Mr. Examiner, does the Commission's files contain a letter from Atwood and Malone, signed by Ross Malone entering their appearance? And in association with Mr. Malone, we are entering our appearance in the case here.

MR. NUTTER: Yes, sir, we do have that letter.

MR. COUCH: I would like to request that Case 2749 be consolidated with Case 2750 for the purpose of hearing.

MR. NUTTER: At this time, we will call Case 2749.

MR. HATCH: Case 2749 reopened. In the matter of Case 2749 being reopened pursuant to the provisions of Order No. R-2440, which Order established 640 acre spacing units for the Indian Basin Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool.

MR. NUTTER: For the purpose of testimony, Case No. 2749 and Case No. 2750 will be consolidated. We would

like to call for appearances in these cases at this time.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, appearing on behalf of Standard Oil Company of Texas. We don't know right at the moment whether we will offer any testimony or not. We may want to put on one witness.

MR. JORDAN: J. B. Jordan, Union Oil Company of California. I wish to make a statement that Union supports Marathon's application for 640 acre spacing.

MR. NUTTER: Where are you located?

MR. JORDAN: At Roswell.

MR. NUTTER: Union in Roswell?

MR. JORDAN: Right.

MR. GEDDIE: Ivin Geddie, I-v-i-n G-e-d-d-i-e, representing Kerr-McGee Corporation, Oklahoma City.

MR. FORD: George H. Ford, Fort Worth, Texas, I'll have a closing statement, appearing for Pan American Petroleum Corporation.

MR. GOODMAN: Fred G. Goodman, Midland, representing Ralph Lowe Estates and Lowe Drilling Company. We highly recommend and concur with Marathon's request for the permanent 640-acre spacing.

MR. STURDIVANT: W. C. Sturdivant, Jr., Dallas, Texas, Sun Oil Company.

MR. NUTTER: Is that S-t-u-r-d-i-v-a-n-t?

MR. STURDIVANT: Right. We anticipate making a statement at the conclusion.

MR. NUTTER: Mr. Kellahin's appearance was for Standard Oil Company, was it not? I believe that's all Mr. Couch, would you proceed?

MR. COUCH: Mr. Nutter, Marathon Oil Company is the operator of twenty wells on a producing status and one temporarily abandoned in the Upper Penn Indian Basin Gas Pool and is also the operator of several wells in the Morrow Gas Pool. It would be our recommendation that the existing spacing rules for each of these pools be made permanent, including 640-acre spacing units. We will have one witness, Mr. Robert Scott, whom I would like to have sworn at this time.

(Witness sworn)

ROBERT SCOTT, called as a witness on behalf of the Applicant, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, will you please state your name and by whom you are employed and in what capacity?

A My name is Robert P. Scott, and I'm employed by Marathon Oil Company as staff engineer in our Houston Division Office. I have been employed by Marathon some fifteen years.

Q Mr. Scott, have you previously testified before the New Mexico Oil Conservation Commission or its examiners and are your qualifications a matter of record?

A Yes, they are.

MR. COUCH: Are the qualifications of the witness acceptable?

MR. NUTTER: Yes, sir.

Q (By Mr. Couch) Mr. Scott, will you please state briefly the history of each of these fields, their time of discovery and general location?

A The Indian Basin Upper Penn and Indian Basin-Morrow Gas Pools were discovered by drilling of the wells which now operates as Marathon Indian Basin Gas Comp. Well No. 1 in Section 23, Township 21, South Range 23 East. This well, at the time of its drilling, was operated by Ralph Lowe interest as the Indian Basin Well No. 1. The field area generally is approximately twenty miles west, northwest of Carlsbad, and twenty miles southwest of Artesia. Both of these pools are of Pennsylvanian age.

Q At the original spacing hearing held for each of these pools in February of 1963, how were the vertical limits of the pools defined at that time?

A At that time, a log of the discovery well was entered and the vertical limits were described by the

representatives for Ralph Lowe as being from about 7453 feet there for the Upper Penn, 7453 to 8054; for the Morrow as described from about 8949 -- 8945 to 9442 feet.

Q Mr. Scott, I will ask you to look at what has been marked Marathon Oil Company's Exhibit No. 1 in these two cases and tell us what type log that is on the left side of that Exhibit?

A The top log on the left hand side of the Exhibit 1 is the log of the same well which was, at the previous hearing, referred to as the Ralph Lowe Indian Basin Well No. 1.

Q All right, sir, now I notice on that log there is an interval colored in purple in the upper 7400 feet range and a portion colored in orange on the left side of the log down in the 9,000 foot range?

A Yes, sir, those represent the perforated intervals for the two completions in that well, the purple being the Upper Penn, the orange being the Morrow perforations.

Q All right, now, generally describe for us Exhibit 1, what it portrays, please.

A Well, sir, our Exhibit 1, which I will refer to as an ownership map, shows on it five separate unitized areas. These are outlined in green. Those are North Indian Basin units.

Q This is at the north end of the map up there?

A Yes, sir.

Q The north central part of the map?

A North central part of the map.

Q All right.

A Then toward the right-hand side of the map to the East, is the Indian Hills Unit; directly below is the Walt Canyon Unit; then over on the bottom of the map of the west top portion is the Bogle Flats Unit. Above and toward the top and on just to the left of the North Indian Basin is the west Indian Basin unit.

Q All right, now, I notice there are a lot of red colored areas there on this map, or red boundary areas; will you say what those represent?

A Yes, sir, those red border sections represent -- there are thirty-five of those red border sections, thirty-four of those are sections which have been communitized for the purpose of development under the temporary 640-acre spacing rules. There is one of these red border sections, where the lease name, or the section name has the term "comp" in it. This is the Bogle Flats Unit, Gas Comp in Section 8 of Township 22 South Range 23 East.

Q Excuse me, sir, isn't that in Section 5, but it is Well Number 8?

A That's right, Section 5, Well Number 8.

Q As a matter of legal interpretation, if I can interpose here, this Section was created as a drilling unit by virtue of the provisions of the Bogle Flats Unit agreement, is that your understanding?

A That's right, that's my understanding.

Q It was not separately communitized by a separate communitization unit, but we show it in red because of the name of the well being "Gas Comp", which indicates communitization?

A Yes, sir.

Q As a matter of fact, there are three other sections within the Bogle Flats Unit that are in substantially the same status, is that right?

A Yes, sir.

Q It would be Sections 9, 16 and 17?

A That is my understanding.

Q All right, sir.

A I would point out the legend at the bottom of the page indicates the green, the usage of green border on the red border. Also, in the legend there, you will see that the Indian Basin Upper Penn Gas Pool well is shown by having the purple circle over the well spot. The Indian Basin-Morrow completions are, which are together with the Upper Penn, indicated by having the well spots colored in the orange.

When using the colors, the orange refers to the Morrow.

Q All right, now, by each of those well spots, you have a date and then a "TD", what is that date on each of the wells, please sir?

A Yes, sir, the dates are the date of completion, the depths are the total depths of the wells.

Q All right, now, I will ask you to look at what has been marked Marathon Oil Company's Exhibit 2; all right, will you state briefly what is depicted by the colors on this map, Mr. Scott?

A Exhibit 2 which I will refer to as the Pool Limit map, the colors here, the purple boundary represents the present horizontal limit of the Indian Basin Upper Penn Gas Pool. The orange border area indicates the horizontal limit of the Indian Basin-Morrow Gas Pool.

MR. NUTTER: As designated?

THE WITNESS: As designated by the Commission.

Q (By Mr. Couch) This is the same base map as Exhibit 1?

A Same base map, same log on the left.

Q So the blue line information on here is the same as Exhibit 1?

A That's right.

Q I notice several little orange semi-circles around

quite a few wells outside the perimeter of the Morrow Gas Pool, Indian Basin Gas Pool.

A This orange semi-circle has been used -- now this is within the Upper Penn Pool Limits, and it does include two wells inside the Morrow Pool Limit. This orange semi-circle has been used to indicate a well that was drilled to the Morrow but found dry. There are some fourteen of those dry Morrow tests shown within the Upper Penn Pool Limits.

Q What is the total acreage as computed, of the fifty-four sections within the present limits?

A The Indian Basin Upper Penn contain fifty-four sections within the designated pool limits and contain some 34,677,78 acres, approximately.

Q All right, and what is the acreage in Continental Indian Basin-Morrow Pool Limit?

A The Morrow Pool Limit includes some 7,035,26 acres, approximately. The well spot colors here are the same as they were on the first map, on Exhibit 1.

Q All right, now, these dry holes in the Morrow substantially surround, or in the Upper Penn it shows some dry hole symbols around that perimeter. Do you know --

A Around the orange bordered area being the Upper Pennsylvanian Pool Limits --

Q You said around the orange, you mean around the

purple?

A Around the purple bordered area, being in the first row of the section around that purple border, there have been some fifteen dry holes drilled. These dry holes do substantially surround the present horizontal pool limits and they do at this time reasonably well define the pool limits.

Q Are the pool limits of the Upper Pennsylvanian Pool constructurally controlled?

A There is some constructural relief here, they have lithologic changes which control a good portion, substantial portion of the pool limits.

Q This would include the gas-water contact in part of the area around there?

A Gas-water contact in part of the area and lithologic change over other parts of the area.

Q You are not testifying about the entire limits of this pool are you?

A No, the entire limits are not either controlled by water or by lithology. It is a combination of the two.

Q As a matter of fact, they are only presently drilling wells outside the pool limits, is that right?

A Yes, sir, Marathon drills in Section 17, Township 21 South Range 24 East, this well we are calling the Indian Hill Unit Gas Comp-A Well No. 6.

Q Would you expect that some additional drilling might occur around the present pool limits?

A It's possible some may occur around the pool limits.

Q What is your feeling about whether the reservoir limits are reasonably defined at this time?

A Substantially defined, that in addition to one well being drilled, there may be others.

Q All right, now, I ask you to look at what has been marked Marathon's Exhibit No. 3. How would you identify that Exhibit, Mr. Scott?

A This is a data sheet, a development data sheet for the Indian Basin Pool Area.

Q Does it show the state of development at the time of discovery and the spacing hearing in February, '63?

A Yes, sir, there are two groups of data here, one being the development prior to February 6th, 1963, which was the date of the previous spacing hearing, the other on the right-hand side being the present, February 8th, 1967.

Q Approximately four years between those two dates?

A Yes, sir.

Q All right, let's just briefly run through those tabulations of the development. Shown on the first line, from the left to the right, across the page, is "wells penetrating within the map limits".

A The first line does represent the well penetrating within the limits of this map.

Q You are pointing at Exhibit No. --

A Exhibit No. 2, this being the same map we used in the other. It shows that on February 6th, 1963, there had been six wells within the map limits that penetrated the Upper Penn, five of these had penetrated the Morrow. Now, some four years later there have been within these map limits some seventy-eight wells drilled penetrating the Upper Penn, thirty-four of which have been carried to the Morrow.

Q Those figures are accumulated around this and they include the six and five?

A Yes, they do include --

Q Is the same thing true of the other figures you are going to give?

A Yes.

Q All right, looking across to the second column, from left to right --

A The second column shows wells penetrating within the present Upper Penn Pool Limits. This is the purple bordered area on Exhibit 2. At the time of the previous spacing hearing on February 6th, 1963, there had been three wells within this purple border that penetrated the Upper Penn, and there had been three wells which penetrated the Morrow. Now, some four

years later within this purple border, there have been fifty-five penetrate the Upper Penn, twenty-two of which penetrated the Morrow.

Going on now to the next line across, this shows wells that were completed within the Upper Penn Pool Limits. On February 6th, '63, there were three wells that had been completed in the Upper Penn, two had been completed in the Morrow. Now, four years later, there have been fifty-three wells completed in the Upper Penn and eight completed in the Morrow.

Now, the last line across there at the bottom, is wells producing within the Upper Penn Pool Limit. At the time of February 6th, '63, there was no pipeline connection to the area, so there were no wells producing. Now, there are fifty-three Upper Penn wells producing and seven Morrow.

Q All right, now, directing your attention specifically toward the Upper Penn Pool and looking at what has been marked as Marathon Oil Company's Exhibit No. 4, will you please discuss that Exhibit, identify it, and discuss it for us?

A Marathon's Exhibit 4 is a data sheet on the Indian Basin Upper Penn Pool, just the Upper Penn. This data sheet shows the number of presently producing wells as fifty-three; it shows the acreage within the present pool limits that I started a minute ago. Below that then, is some production data.

This is cumulative gas produced to January 1st, 1967. This shows a volume of some 38,912,000,000 cubic feet. The next line shows cumulative condensate production to January 1st, 1967, to be some 310,500 barrels. The cumulative water production shown, that is to January 1st, '67, was 142,000 barrels.

Q Mr. Scott, the source of that information, I see the figures appear to be rounded off, that's correct, isn't it?

A Yes, these are slightly rounded numbers.

Q Where did you obtain those?

A Those numbers were taken from the engineering committee's statistical report, with December's production, being gotten from other productions, so they were rounded --

Q All right, going on with Exhibit 4, the next group of data.

A I would point out one thing here. The condensate production figure does not include any planned product.

MR. NUTTER: Field condensate only?

THE WITNESS: Yes, sir. The next group of data is core and log data. We have there two porosities. The data for the first one, is porosity from cores, these are cores that we had available to us on seven wells. Here we contended that the porosity below 2% didn't represent pay. The average

porosity from the cores on the seven wells waited for the final sample information, which was 4.32%.

Now, the second figure for porosity, the porosity value that has been obtained from logs, all the logs in the field that we had available to us, which is all the logs. This figure is 4.50% porosity. The next line represents the permeability, the permeability from cores. This is the same seven wells for which we calculated a porosity from the cores. The permeability weighted average 46.3 millidarces. The range of permeability for these same pays was 3,150 millidarces, down to 0.1 millidarcies.

Q And again you only consider the permeability where you had porosity?

A This is for the same pay that had 2% or better porosity. The last line there under, is connate water saturation, and as calculated from the logs, showed approximately 25%.

Q All right, sir, going on to fluid data?

A Fluid data presented here for the Upper Penn is this: gas specific gravity, 0.65, compressibility z factor 0.84 condensate gravity, 59 A P I at 60°F, approximate condensate yield is 8 barrels per MMCF.

Q All right, now, then, the reservoir data that appears in the last group?

A Under reservoir data, the first line represents my estimate of the original reservoir pressure data of a minus 3640. There is an approximate figure of 2917 PSIG. There were pressures higher than this measured. I can think of two immediately, one, 2940 and there was one recorded as high as 2952, that I can recall. This 2917 PSIG approximate original reservoir pressure is a minimum in my estimates.

Q All right, now, your reservoir temperature?

A Reservoir temperature, 146° F.

Q You show the gas-water contact. Is that intended to be exact or specific?

A No, sir, from the drilling and production data that was available to us, we have estimated gas-water contact as a -3770.

Q All right, please look now at what is marked Marathon's Exhibit 5. Again, Mr. Scott, you used the same base map as Exhibits 1 and 2?

A Yes, sir, same base map.

Q You've got a different color scheme here?

A Completely different color scheme.

Q Will you please identify and describe Exhibit 5 for us.

A On Exhibit 5 we have presented all of the bottom-hole pressure data that was available to Marathon through

January of '67. These bottom-hole pressure measurements are printed on this map in three different colors. You will notice on the legend at the bottom of the page, the orange color is used to indicate the pressure that was taken in the period prior to March 1, '66.

Q Now, why did you cut it off and use one color up to that date, Mr. Scott?

A We considered that prior to March 1st, '66 there had not been a very substantial amount of production from the field at that time.

Q A gas plant handled the main volume of the field and it went on stream in February, '66, didn't it, or late January?

A Yes, Southern Union had been taking some gas since August of '65, but this was a fairly small volume in relation to the total taken from the field prior to that time. The Indian Basin Plant went on, January 26th, 1966. There were start-up difficulties and it was approximately March 1st before we had a really substantial, substantially settled production.

Q All right, then, the next coloring of pressure data there is in red and that covers what period?

A The red bottom-hole pressure points were taken in the period from March 1st, 1966, to August 1st, 1966.

Q And then you have some in green?

A Yes, sir, the green figures for bottom-hole pressures were taken during August of 1966.

Q Mr. Scott, in relation, then, to the pressures for which data is shown on Marathon's Exhibit 5, were some of these pressures just taken from C-122's, some of these pressures, and this is disregarding the time periods here.

A Some of these pressures were taken from U.S.G.S. Reports.

Q That is reports to the U.S.G.S.?

A To the U.S.G.S. Some were taken from 122's where a bomb was run in where P Sub C was reported.

Q It appeared that way from the C-122?

A Yes, sir.

Q Now, some other pressures, you got directly from another rate?

A Yes, sir, we had actually bottom-hole pressure measurements and we used here all bottom-hole pressures where we knew there was established twenty-four hour shut-in.

Q And you didn't use other pressure data, such as drillstem pressure or things of this nature?

A No, sir, drillstem test pressures do not appear here at all.

Q Why did you select to use the pressures you have shown on this map and not try to include drillstem tests,

bottom-hole pressures and other sorts of information?

A We really thought that these measurements represented a more accurate picture of the pressure in the reservoir.

Q All right now, the green figures then, represent pressures taken during the month of August 1966?

A That's right.

Q Will you please tell us about those pressures and the procedures, or how they were taken?

A Where there is some there in green? The New Mexico Oil and Gas Engineering Committee was requested by the operators to run a field-wide bottom-hole pressure survey during the month of August. There are thirty-nine green pressures shown on the map that were taken in August. Of these, thirty-eight came from the Engineering Committee's survey. There was one of those green pressures that was available from C-122 data.

Q All right, sir, now in the report of this survey there is one pressure included that you show in red on this map, isn't that right?

A Yes, sir, there was one pressure reported by the Engineering Committee in their summary report of the pressure survey that was taken in June. It is shown in red color to put it in the right time period.

Q All right, which well is that on, please?

A That's the Union Oil Company's Union Federal 28 in Section 28, Township 21, Range 23.

Q All right now, have you computed just the arithmatic average pressure contained during this survey?

A Yes, sir, disregarding the two pressures that were included in that survey that were substantially lower than the rest, and averaging the remaining thirty-seven pressures, the average pressure, the arithmatic average pressure was 2890 pounds per square inch.

MR. NUTTER: Which two were taken?

THE WITNESS: This was 2347 which is on the Infield, by the Infield Federal Well of Section 18, of Township 21, 23. There was 2648 from the Ralph Lowe Indian Basin C Well No. 3 in Section 25, Township 21, Range 23.

MR. NUTTER: Let's do that again.

THE WITNESS: Section 25, Township 21, Range 23.

MR. NUTTER: That's 2648?

THE WITNESS: Yes.

MR. NUTTER: How about that 1659?

THE WITNESS: That was from C-122 data, that was not included in the Engineering Committee Reports so this was not the average I was speaking of.

Q (By Mr. Couch) There are three green figures shown

here that were not included in the average, is that right?

A Yes, two that were substantially lower than the rest in the Committee's report and then this one, that was reported from C-122.

Q 1659 of the J. C. Williamson Standard Gas Comp?

A Yes, 1659.

Q 1659?

A Yes.

MR. COUCH: I notice here on my map, we corrected nearly all of those, I think, but if any of you all have 1655, it should be 1659.

Q All right now, you have also, on this map, some black arrows, seven of them as I count. Will you tell what those indicate?

A Those black arrows point to wells which we have colored with different colors for each well, and these wells are shown on our next Exhibit, Exhibit 6.

Q Mr. Scott, while we are passing out this Exhibit, why did you select those seven wells, to call your attention, why are they important?

A These wells, these seven wells are the only wells for which we had bottom-hole pressure run, both during the period of substantial production, March to August 1st, and during the survey period in August of 1966. These are only

seven wells.

Q Where you had pressure in both the red and the green period?

A That's right, in both the red and the green period.

Q All right now, will you then turn to Exhibit 6 and tell us what that shows with respect to these seven wells?

A Exhibit 6 has on it, for each of the seven wells, every bottom hole pressure point that we had available for each of those wells.

Q You are again speaking from the source that you earlier described in more detail?

A Yes, same source, each of these pressures are listed on this map also in its proper color.

Q All right, sir, there are some colored bars down here at the bottom of Exhibit 6 in orange, red and green, what do those represent?

A Those colored bars relate back to the same time periods that we pointed out before on Exhibit 5, the orange representing the time period up to March 1st, '66, the red indicating the time period from March 1st to August 1st, and the green indicating August, 1966.

Q All right, that is before, during and after substantial production?

A Before, during and after.

Q The color on the bars there, or on the lines connecting the pressure points on Exhibit 6, coincide with the colors of the well spots of those wells shown on Exhibit 5?

A Yes, they do, and each well is listed in the legend on the lower left-hand side of Exhibit 6 with the well name and location next to it.

Q All right now, Mr. Scott, you testified earlier to your data sheet showing a conservative, approximate bottom-hole pressure of 2917 P.S.I.G., is that right?

A That's right.

Q And you mentioned some other wells that had higher pressures, is that right?

A That's right.

Q As far as the original reservoir pressures are concerned?

A The initial pressures may be applied to the well.

Q All right now, Mr. Scott, will you take a pencil, and others that have a copy of this Exhibit, if you will put over here on the left top side of the Exhibit 6, the figure 2940, about where that would fall, and this is a rather wide scale, isn't it, Mr. Scott?

A Yes, this is, as you notice there is a hundred pounds between the two lines in the center there.

Q 2940 might even be a little bit over the top of that scale?

A No, 2940 will be approximately a half inch below.

Q All right, I have got mine marked. Now, let's put 2917 about where it would be.

A 2917 will fall above any of the points on that exhibit, it would be somewhat over, approximately an inch or so above the bottom of 2931.

Q All right, now referring to that 2970, did you lean pretty heaving on the data of the Marathon well?

A Yes, I did. In arriving at the estimated original reservoir pressure this was the data for which I had the best field. I knew more about how the data was taken, so I estimated the weight of Marathon's data a little more so than I would have such data as C-122 furnished from other operators.

Q You judged the factor on the conservative side?

A Yes, sir, I did.

Q All right. I notice three top colors there, the blue, tan and purple showing the pressure and connected pressure points of the wells. Each of those three have higher pressures on the first pressure shown on them than the pressures of the other colors in, along about that same period of time, during the red period. Do you have the pressures on those three wells starting from the blue one?

A Yes, the blue one, the first pressure there, is 2907. This is during the red period of time.

Q All right, I'll put that on my map, and any of the rest can follow.

A The brown one is 2887.

Q The purple one?

A The purple one is 2878.

Q All right, Mr. Scott, now your pressure point becomes level at an early point in time for all of those three wells. Tell us why.

A This was the first pressure measurement made on those wells. These wells were either completed at this time or one of them was not connected prior to the time. It had been completed a couple of months early. This is the blue one. It had been completed March the 1st. The pressure measurement was in May, I believe, the scale shows.

Q All right, then would you consider that those top three there, the blue, tan and purple are initial pressures on the three wells, that you referred to?

A Yes, sir, I would.

Q All right now, on the other four wells, those wells have been completed and on production for some time, have they not?

A That's right, each of them had been completed on

production prior to the time the pressure was taken during the red period.

Q All right now, what is the significant point to you about the way these seven wells behaved in between the time their pressures were taken during the red period of production and then during the August 1966 survey?

A The real significant thing to me is that these are the only wells upon which we had pressure during both the red and green time period and all of them reacted exactly the same, all of them showed increased pressures in August.

Q Some showed more than others?

A Some showed more than others, but they all increased; there were no exceptions.

Q Is it at all significant to you that the initial pressure on the blue, tan and purple were substantially below either of the bottom-hole pressure figures, original bottom-hole pressure figures you have mentioned?

A Yes, sir, it is. I would point out one thing, this August time period, the wells in the field for the purpose of surveying, were shut-in in groups so that when we had -- had pressure measurements on them, there were one, two, three, four wells around it shut-in on the same day.

Q There is no specific or exact pattern to this is there?

A No, sir, there is no all encompassing pattern, they're not all exactly --

Q But some wells around each of these key wells, as we call them, were actually shut in, either for taking pressure or just getting ready to take pressures?

A That's right?

CROSS EXAMINATION

BY MR. NUTTER:

Q Now, Mr. Scott, let me interrupt here. You have got seven wells that had pressures in the red period and those are the only seven pressures that you had during that red period in this field?

A No, sir, we had two other pressures during that period, but for the other two wells, we did not have pressures for the August period.

Q So, these are the only seven wells that you had pressures during the red period and green period?

A Yes, sir.

Q Now, some of these initial pressures were taken upon completion, prior to production, is that correct?

A Yes, sir, three of them are.

Q And they were taken, I presume, by the individual operators as they completed their wells?

A Yes.

Q Now all of these pressures from this green period were taken by the Engineering Committee?

A Yes.

Q You had a couple of pressures that you threw out, and one because it wasn't taken by the Engineering Committee, but on these seven wells, these were all taken by the Engineering Committee?

A That's right.

Q Now, I'll ask you the obvious question; why are the new pressures higher than the old pressures, than the original pressures?

A You mean why is the August pressure higher?

Q Right.

A There are two things here, one, of course, is related to the fact there were wells shut in around these key wells, if you want to call them that, during August. The other is that in analyzing the production for the month of August for each of these seven wells and looking at it not just as one well, but as a group of wells, the block of wells around that.

MR. COUCH: You are talking about, for example, a nine square section area including all observation wells?

THE WITNESS: There was significantly lower production during August for each of those than there was during

July.

MR. NUTTER: I presume you were going to get to this, but I couldn't wait.

MR. COUCH: We are glad we encouraged this interest, Mr. Nutter.

MR. NUTTER: You are going to show drainage by this effective build-up, I presume?

MR. COUCH: Well, sir, let's just go ahead and let me see what we can show.

REDIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, was that presented as an interference test, this data that you are presenting here?

A No, sir, it was not, we took all the pressure information that is plotted on the map, Exhibit 5, and started analyzing this, and this theory came out. These were not key wells picked for that. These were just ones that fell out in our analysis of it.

Q In other words, what you have attempted to do here is assemble all available pertinent data and bring it to the Commission, not for the purpose of trying to manufacture evidence for the case or anything of that nature, is that right?

A That's right.

Q So this we can't say is a perfect demonstration of an interference test, but it is actual field conditions and field testing procedures that were followed?

A You could not call this ideal interference test conditions.

Q Mr. Scott, two of those wells on which initial pressures were taken were Marathon Oil Company wells, weren't they, in the red period?

A In the red period.

Q Do you know whether Marathon had people present during the taking of the survey, bottom-hole pressure survey in August, '66?

A By Committee survey?

Q Essentially, yes.

A In this survey, the operator did furnish help for the Engineering Committee to run it, yes.

Q Was Marathon present during most of these occasions?

A Yes, sir.

Q Go ahead.

A Yes, sir, there was a Marathon representative each time a pressure was taken around a Marathon well.

Q Do you know whose equipment was used in the taking of those pressures in the survey?

A During this survey, the Engineering Committee lost their bomb in the fifth well that they bombed. They did ultimately fish it out, but we had to run, that is, Marathon had to run our instrument into the hole behind them on two of these first five wells and we had to check pressures between their bombs and our bombs. When they lost their bomb, they then took our bomb and completed the survey with it.

Q All right, Mr. Scott, I will ask you now, then, to look at what has been marked Marathon's Exhibit No. 7. Please identify that, and tell us briefly what it reflects.

A Marathon's Exhibit 7 is a sheet showing well cost or economics for the Indian Basin Upper Penn Pool. Here is what we have done; and the first line shows the well cost of a typical Upper Penn single completion. We took this from actual dollar values that Marathon has spent on the wells that they have participated in the drilling of. This typical well cost $155,000.00. I would say that we have not drilled very many for that.

Q As a matter of fact, this typical log expansion you now have is what might cause you to drill another?

A Yes, this cost you could expect today, with the expense you have behind you and I think it is a good typical number of what it would cost Marathon to drill one single well.

Q Do you think it's high or conservative?

A I think it is a good figure.

Q Go on to the next line.

A In relation to using this $155,000.00 we have shown here what the approximate cost of fifty-three successful Upper Penn completions would have been, at $155,000.00 per well. There are fifty-three completions now in the Pool; if these fifty-three completions had cost $155,000.00 each, that would be an expenditure of $8,215,000.00. As a matter of fact, there has been substantially more money than that spent to develop these fifty-three completions.

Q All right, and then what is the last figure you have got on there?

A The last line there shows the approximate cost of fifty-two additional wells to drill to 320 acre density within present pool limits at this same $155,000.00 per well. This would require an expenditure of $8,060,000.00.

Q Mr. Scott, do you have any opinion on whether any additional volumes of gas that might be produced by the fifty-two additional wells would come anywhere near this $8,060,000.00 figure?

A It is my opinion that fifty-two additional wells to drill to three hundred and twenty acre density would not yield a substantial enough volume of additional gas and therefore to have this pool on three hundred and twenty acre spacing would

require drilling fifty-two unnecessary wells and result in economic waste.

Q All right, now, Mr. Scott, you gave us a cumulative production figure awhile ago on your Exhibit No. 4.

A Yes, sir.

Q I wish you would give us that again, please sir.

A This was 38,912,000 cubic feet.

Q That was to January 1, '67, wasn't it?

A That's right.

Q Just briefly referring to your Exhibit 6, again, would you give us some approximation of what the cumulative production was up to the time of the August survey, the green period that was August, '66, what the cumulative production you gave us was to January, '67?

A Yes, sir, I don't have the precise figure on it, it is approximately 19,000,000,000 cubic feet.

Q Now, Mr. Scott, considering all of this information that you have here that is available to you, give us your opinion as to whether a well in the Indian Basin Upper Penn will sufficiently and economically drain in excess of six hundred and forty acres.

A It is my opinion that the Indian Basin Upper Penn Pool will sufficiently and exonomically drain in excess of six hundred and forty acres.

Q Now, you have already testified that drilling up to a density of three hundred twenty would constitute the drilling of an unnecessary well?

A Yes, sir.

Q So can you state, in relation to the establishment of six hundred and forty acres as permanent spacing for this pool, whether in your opinion that would tend to prevent the drilling of an unnecessary well?

A It is my opinion that the establishment of permanent six hundred forty acre spacing for the Indian Basin Upper Penn Pool will prevent the drilling of unnecessary wells and prevent economic waste.

Q What about exposure to physical waste, Mr. Scott?

A Well, the drilling of a well in the -- there is circulation problems in the Upper Penn;there have, in fact, been two blowouts so the drilling of an unnecessary well to me leaves open the possibility for physical waste.

Q It would increase that exposure?

A Definitely increase that exposure.

Q All right, now, Mr. Scott, let's refer specifically to the Indian Basin-Morrow Gas Pool and look back at Exhibit 2, the Pool Limits map.

A All right, on Exhibit 2 this refers to the Indian Basin-Morrow; now, noticing again that the horizontal pool

limits are outlined in orange.

Q These are the pool limits that Mr. Nutter mentioned that were presently fixed by the Commission?

A That's right.

Q Noting again that the orange half circles have been used to indicate the wells that are Morrow duals. Now, are all Morrow completions duals, Mr. Scott?

A All of the Morrow completions are duals within the Upper Penn. Noting again that the orange half circles show some fourteen dry holes that have been drilled within the Upper Penn Pool Limits, dry as far as the Morrow is concerned. I would point out here that of the eight successful completions in the Morrow only seven are now producing. One of those wells produced only fuel and its bottom hole pressure declined to less than 500 pounds where it will not now go under the basin part.

Q Is that one of seven or one of eight?

A One of eight.

MR. NUTTER: Which one is that?

THE WITNESS: It is Marathon's Indian Basin No. 6, Sections 22, 21, 23.

MR. NUTTER: So it is deleted in the Morrow, so to speak?

THE WITNESS: Until at least such time as it is

economically feasible for the present method of operation, yes. This leaves us with seven.

Q (By Mr. Couch) It has not been plugged and abandoned in the Morrow?

A No, sir.

Q All right.

A I would like to point out here, referring back to Exhibit 3 that on the record line there, we show that there are two wells penetrating the Morrow as of this date, within the Upper Penn Pool Limits. Only seven of those wells are producing a success ration of one to three for development wells in the Pennsylvanian. A poor success ratio.

Q All right, Mr. Scott, tell us a little more about the reservoir pressure performance and other data regarding the Morrow Pool.

A Exhibit 6 which we have here is a data sheet for the Indian Basin-Morrow Gas Pool and we can go down it again, as we did the one on the Upper Penn, pointing out that it does show the number of wells, the acreage and so on. It doesn't point to other reservoir data.

I have put on this Exhibit the original reservoir pressure data of -5353 and estimated it to be 3680. Right below there, I pointed out that the measured range of initial pressure is from 3208 P.S.I.G., to 3750 P.S.I.G., there again

using my judgment to make an arithmetic estimate of what the average, or average initial bottom hole pressure is, thirty six eighty.

MR. NUTTER: Did you use two porosity cut-offs on this pool also?

THE WITNESS: Yes, sir.

Q (By Mr. Couch) Mr. Scott, would you say that the reservoir pressure performance is erratic?

A Yes, sir, the pressure performance has been quite erratic for the Morrow.

Q What about the pay in general?

A In drilling of the Morrow, I believe everybody that has drilled it has found the pay, itself, to be quite erratic.

Q In your judgment, in order to have any possible economic way to complete in the Morrow, how would it have to be done?

A In my opinion, the only reasonable and economic way to develop Morrow production is through drilling in the Indian Basin Upper Penn Well.

Q Does the pump limit prevent development of these pools?

A That's right.

Q All right, will you then look at Exhibit 9?

A All right. Our Exhibit 9 is again, a well cost or economic tabulation. Going down this Exhibit and using again the actual cost figures that were available to me from the Marathon drilling cost as the wells from which Marathon participated in, it is my estimate that a typical Morrow single completion, with no attempt to complete in the Upper Penn, would cost some $200,000.00; well cost of a typical Morrow single completion.

Q If there was an unsuccessful attempt to complete the Upper Penn, would $210,000.00 be feasible?

A The well cost of a typical Morrow Upper Penn dual I estimate at $257,000.00 and I would like to qualify that number. We have not drilled one, a dual completion for that low a figure, so really, what I put down for this figure, the $257,000.00 for a dual, this is not based on our actual money experience, this is based on the fact that we have no drilling experience in the area and we think we could drill one for this amount. Now the last figure there shows that, the last dollar figure shows the additional cost to dual in the Morrow with an Upper Penn well, that is above the cost of the Upper Penn single, that is $102,000.00 extra cost, cost of an Upper Penn single. The last line there, I have estimated the chance for success based on the experience in this Pool Area at 33%.

Q Again, you are talking about development wells?

A Again, we are talking about development wells.

Q Trying to be development wells?

A That's right.

Q All right, now, have you got some estimates and they would have to be estimates, of the ultimate recovery to be expected from a Morrow completion, assuming you could make one?

A Yes, sir, assuming you could make one, and on an average basis, not taking the high nor the low, I would state that you could expect to recover from one to two bilion cubic feet from a Morrow completion.

Q All right, sir, what does that mean to you in terms of whether it would be an economic venture to drill a well for Morrow production only?

A A straight up well or Morrow, a well drilled just for the Morrow production, based on this estimate of probable ultimate recovery, would not be an economic venture.

Q Well, is the dual completion commercially attractive?

A A dual completion is a poor economic venture, but it does present the only reasonable economic route to produce from the Morrow.

Q For anyone who wants to attempt it?

A That's right.

Q All right, will you then give us your conclusion with regard to permanent pool rules for the Indian Basin-Morrow Gas

Pool?

A For the Morrow, based on the manner of practical application of the economics and that is being usage of dual completions out to development of the Morrow and our knowledge, erratic knowledge of the pay, it is my opinion that the development should be the same as that for the Upper Penn.

Q That is spacing?

A The spacing should be the same as that for the Upper Penn. I would therefore recommend that -- it is my opinion that six hundred and forty acre spacing will prevent the drilling of an unnecessary well and prevent economic waste. Again I would point out that there have been two blowouts in the field and the drilling of an unnecessary well does present a problem or possibility of physical waste.

Q Mr. Scott, do you have any other direct testimony to offer at this time?

A No, sir.

MR. COUCH: That concludes the direct examination, Mr. Examiner.

MR. NUTTER: I think before we get into cross examination, we will take a ten-minute recess.

(Whereupon, a short recess was taken)

MR. NUTTER: Hearing will come to order. Does

anyone have any questions of Mr. Scott?

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Scott, up north of the Indian Basin Pool, there are a couple of Faskin Wells in Sections 4 and 5 of Township 24 South 24 East, I believe those are Morrow wells, are they not?

A Yes, sir, my understanding is that those wells are in the North Indian Hills-Morrow Gas Pool.

Q Now, this Union well of Section 18 of that Township, which is shown "dry hole", did it go to the Morrow zone?

A Yes, sir, the total depth shown on the map is 9,755.

Q And at the present time, Marathon's No. 6 in Section 17, is not projected into the Morrow?

A No, sir, not at the present time.

Q So as far as 17, we know, these two wells in Section 4 and 5 are in different pools and from the wells we have got data on, are not projected today, they will remain in a different pool?

A Yes, sir.

Q It just happens, by the way, that surveys were made of those wells, as 900 acre wells, rather than 640; I just wondered if there would be any apparent drainage by any other

wells, by those large acreages.

A I wouldn't anticipate it.

Q Now, Mr. Scott, would you elaborate a little further why you have used 2,917 as the original pressure for the Upper Penn?

A We we did take the original measured pressure, the pressure measurements that were made by Marathon were in this time period prior to substantial production. These pressure measurements were on the low side where other pressure measurements were on the high, and since I knew more about how the Marathon pressures were run, I, in my own mind, put more weight on them, this is why I came up with as low an average as that; and this is why I state that it was what I would consider a minimum.

Q Now, these higher pressures, meaning 2952 and 2947, I believe; were those drillstem tests shut-in pressures or were they measured pressures?

A The 2940, that I mentioned earlier, was for the Sunbright Federal Well and this was on a C-122, so here I don't have -- this is the purpose for which it was taken. I believe where I got -- yes, where I got that was from AU, that is a report to U.S.G.S. Form 9-330.

MR. COUCH: Not C-122?

THE WITNESS: That is not where I got it, but the

Sun gentleman told me this was available from data they had taken from a C-122. I would not -- the question of the usage of a higher original pressure than 2917, it is just in my arriving at a number I had to, in my mind, irradiate it.

Q (By Mr. Nutter) Now, you gave a statement of estimated recovery between one and two billion cubic feet. I didn't hear any figure relating to the ultimate recovery from the Upper Pennsylvanian. We have got all the data we need here to calculate volumetric reserves, except possibly the net feet of pay. Do you have any idea as to reserves here for the average well or for the pool as a whole?

MR. COUCH: Mr. Nutter, excuse me, please sir. I am not attempting to preclude the Commission from any information we have that would be of interest or help to you, but it was our contention in preparing for this hearing that we would be talking in terms of spacing rather than in terms of any allocation or production of the wells, and so no effort was made to attempt to compute these things. It would be necessary in any allocation.

MR. NUTTER: Mr. Couch, the Commission has already considered the economic development of a pool. We have got economics over well costs in here as a matter of record. What it would cost to continue to develop the pool on 640 acre spacing was compared with development, of 320 acre spacing

reserves and was entered into the order in the original hearing in this case when there were three wells drilled. I believe, well, a maximum of six, apparently, within the map requirement. We had a reserve estimate at that time which was four years ago, and I think subsequent development here has shown a lot of things and might show how, well, these reserves that were entered into the record four years ago, it might show how accurate they were.

MR. COUCH: We do know of a reserve figure that Principal Pipeline Purchaser has made, a reserve for the field and you can allocate that, or use that figure if you like.

THE WITNESS: If you like, from the information that is available to me, that natural gas has worked out, I believe that they estimated for the Upper Penn, dedicated to them, approximately 1.3 trillion. Now, if this is extrapolated for that dedicated to the Southern Union, I believe you would come up with the actual proper range of 1.4 to 1.5 trillion.

Q 1.3, that is dedicated wells?

A Yes, sir.

Q Now do they have a comparable figure on the Morrow wells?

A Yes, the number that they presented to us for the Morrow, dedicated to them is, may I get that out, I believe I

have that letter with me, 24.8 --

MR. COUCH: Just give it as it's shown.

THE WITNESS: All right, 24,868 M.M.C.F., and this is quoted from the letter of Natural Gas Pipeline Company. This is dedicated natural gas.

Q 24,868 M.M.C.F.?

A Yes.

Q Now, these wells are dedicated to Natural Gas Pipeline?

A Yes.

Q Do they have all connections in the Morrow?

A No, they don't.

Q This extrapolated figure then too includes the Southern Union dedication?

A Yes, sir, it comes to 28,971 M.M.C.F. on their figures.

Q Now, these figures that you have given Mr. Scott, are they up-to-date, I mean we have got fifty-three wells producing from the Indian Basin Upper Penn at this time, or have they done this on the field basis regardless of whether a well had been drilled or not?

A No, sir, the tabulation they mailed to us is on a well basis.

Q Does it have fifty-three wells for the Upper Penn?

A Yes. Yes, sir.

Q And then the figure of 24,868 or 28,971, is it based on the seven or eight Morrow wells?

A Their tabulation shows nine. I would have to spend a little time with it to see why. Oh, it includes,their tabulation includes one well that was not completed in the Morrow and includes 1,106 M.M.C.F.; that is, well - the figure that they gave for that well was 1,106 M.M.C.F., so this well was not completed in the Morrow. If that number were subtracted off, then this would give a number representing their estimate of reserves for the completed wells and that does include Natural Gas and Southern Union.

Q Now, could you give me the price that is paid for the gas and condensate in this area by the two purchasers?

A Sixteen and a half M.C.F., $2.76 per barrel. These are the latest numbers available to me.

Q Now, that is Natural Gas Pipeline, do you know what Southern Union pays for their gas?

A No, sir, I don't.

MR. COUCH: For the record, Mr. Nutter, I don't believe Natural Gas Pipeline is the purchaser of condensate, but that is the price, I know for gas. I don't know who the condensate purchaser is.

THE WITNESS: Permian.

MR. COUCH: But again that is condensate sold from the plant as distinguished from condensate that may be sold from any --

Q (By Mr. Nutter) I that condensate less than 18¢ trucking fee?

MR. ENFIELD: 17,725 for the net, less taxes is what we get for condensate.

MR. NUTTER: Let the record show that was Robert Enfield responding to that question.

Q (By Mr. Nutter) Now, Mr. Scott, on those green pressures that we were talking about a while ago, we had two or three that were low. To what do you attribute those low pressures, and what was the length of shut-in time to obtain the other pressures that the Engineering Committee ran?

A During this green period?

Q Yes, sir, the green period.

A They were all at least twenty-four hours. There were two pressure reports of the Engineering Committee that were run by the operators, but they again reported at least twenty-four hours shut-in.

Q Were some shut-in more than twenty-four hours?

A Yes, some were shut-in at least --

Q Were they shut in until pressures were stabilized? What is the difference in a twenty-four hour and thirty hour

shut-in?

A My estimate would be that the wells were probably shut-in at a certain time of the day and by the time they got around to bombing them, it was some hours later. There was one pressure in that group, I think it was reported by the operator though, yes, sir, one pressure in that group which was run by the operator, was a one month shut-in.

Q Which one was that?

A This was the Redferns Winston Gas Comp, Section 39, 21, 34.

Q And had a pressure of 2,880?

A 2,880.

Q That was a thirty day shut-in?

A Redfern Development Corporation.

Q Well, now, Mr. Scott, does there appear to be variation in the permeability, as you go from one area to the other , that would cause a difference in the way these wells reacted to shut-in, that is whether pressure would build up or not?

A Well, of course, with only cores of seven wells available to me, it would be very difficult for me to make an estimate on a field-wide basis as to whether this occurs or not; from the core samples that we had, some were very long cores with lots of samples, some were short ones, and to say that

they were truly representative in total, and to try to get something like this from it, I would hesitate to do that at this time.

Q Well, we do have a difference in the pressures measured, particularly out here on Section 19 and these pressures are 1,659 pounds, what would contribute to a real low pressure like this?

A Well, sir, if you will look at the Odessa-Natural Winston Standard Gas Comp No. 1, the entire pressure history here has been quite erratic. I would just say that on this well behaves erratically.

Q How about the well's production, is it a good producer?

A Would you like to know how much it is?

A Well, not especially, is it a good producer or a poor producer?

A My understanding is, it is very poor, although I can give you the cumulative on it through 1967 -- through '66, I mean. It has produced cumulative gas of 1,103,198, according to my records, that is M.C.F., 1,103,198 M.C.F.

Q Through '66?

A Through '66.

MR. NUTTER: Does anyone have any questions of Mr. Scott?

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Scott, these porosities from your cores and your logs are relatively low, aren't they, at least they are not very high?

A I think that they are not exceptionally low, considering that this was a dolomite reservoir basically.

Q But the permeability then, is quite good?

A I was pleased to find in my analysis of the permeability that it was this good from the core samples available to us, yes.

Q Would you think that the good production from the wells in this pool results from the relatively good permeability in the pool?

A Do you mean, well by well there, can you rephrase it a little?

Q Yes. These wells are quite good in general, and would you say that the reason they are good is because of the relatively high permeability present in the Pool?

A Yes. I would add this, the dolomite is fracked in part, it's vugular in part, it is possible that this permeability average I have would be even higher if you could evaluate the fracture permeability and some of the permeability due to the vugular nature of it.

Q Would you consider this permeability to be relatively constant across the main portion of the field?

A I think that the bottom hole pressure behavior that bottom hole pressure data that this is true.

MR. STAMETS: That's all the questions I have.

MR. NUTTER: Are there further questions of Mr. Scott?

MR. COUCH: I have one or two.

REDIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, what is your opinion regarding the capacity of the existing wells in these two pools to supply the market demand for the foreseeable future?

A The capacity of these wells is well in excess of what is necessary to supply the immediately foreseeable market demand.

Q All right, and the overall spread in the pressures taken during the survey is approximately how many pounds, not counting the two low pressures and throwing them out?

A The pressure spread between those that are in a group, is sixty pounds.

Q That is, high and lowest, if you throw out one that you think is just an odd-ball?

A That's right.

Q Over a total of how many acres, did you say?

A 34,766.6, I would have to look it up again.

MR. NUTTER: Mr. Scott, in saying that the capacity of these wells is sufficient to satisfy the market demand, are you considering the weather in Chicago this last week?

THE WITNESS: Yes, sir.

MR. NUTTER: Are there any further questions. If not the witness may be excused.

MR. COUCH: I would like to offer -- I better ask Mr. Scott.

Q (By Mr. Couch) Were Exhibits 1 through 9 prepared by you or under your supervision, Mr. Scott?

A Yes, sir.

MR. COUCH: I offer in evidence, Marathon's Exhibits 1 through 9.

MR. NUTTER: Marathon's Exhibits 1 through 9 will be admitted in evidence.

(Whereupon Marathon's Exhibits 1 through 9 admitted in evidence)

MR. NUTTER: Do you have anything further, Mr. Couch?

MR. COUCH: No, sir, other than reservation of the right to make a final closing statement.

(Witness excused)

MR. NUTTER: Does anyone have anything?

MR. KELLAHIN: I have one witness. He will be

quite brief, that might be helpful. Jason Kellahin appearing for Standard Oil Company of Texas; I have one witness I would like to have sworn.

(Witness sworn)

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Paul Hull.

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

A Standard Oil Company of Texas, Supervising Proration Engineer.

Q Have you testified before the Oil Conservation Commission of New Mexico and made your qualifications a matter of record?

A Yes, sir, I have.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

(Whereupon, Standard's Exhibits 1 and 2 were marked for identification)

Q (By Mr. Kellahin) Mr. Hull, have you made a study

of the economics of the producing gas from the Indian Basin Upper Pennsylvania Pool?

A Yes, sir.

Q Did you make the same study as to the Morrow?

A No, sir.

Q And for what reason?

A We have no wells in the Morrow.

Q Now, in connection with your study of the Indian Basin Upper Pennsylvanian Pool, what did you do?

A Set up a reservoir group as a computer program, as part of the computer library to calculate a number of factors concerning a gas reservoir, one of which, being cumulative production for spacing and this provided a number of other perimeters at the same time, the period required to produce the reservoir, and this is a rather routine calculation that we make of a number of fields.

Q Now, is this calculation contained on what has been marked Standard's Exhibits No. 1 and 2?

A It is.

Q Would you state briefly what was done on Exhibits 1 and 2?

A The only difference in these Exhibits is that 1 is calculated for one well on 640 and the other for two on 640 acre spacing and 320 acre spacing.

Q Now, you had to have some basic data in order to perform this calculation, did you not?

A That's right.

Q What was your source of data for the calculation?

A We obtained a number of the reservoir perimeters from Marathon because they had been making a considerable more study, detailed study of the field than we had. Specific gravity of gas is a factor, initial bottom hole pressure and the reservoir, temperature from Marathon, some of the other factors, net pay, we picked from one of our logs.

Other data that was plugged in here,well contract time, the pressure basis and the point when it would be necessary to install a compressor in order to deliver the contract quantity of gas; and working interest, well operating costs, compressor maintenance cost, these things were of value.

Q Now, you have one heading there "contract time, twenty years", that is the term of the contract you have on the gas production, is that correct?

A That's right.

Q You used somewhat of a higher initial pressure than Marathon, did you not?

A No, sir, this is the same. Marathon's gauge was figured the same, one is gauge and the other is absolute.

Q I see; so for the purpose of this calculation, they are the same pressures, basically, is that correct? I mean, same initial pressures?

A I believe that's right.

Q Now, you picked 142 as your net pay thickness?

A Yes.

Q How did you arrive at this figure?

A This was from one of our logs that had an average potential and we ran this program rather hurriedly and didn't feel we had time to make a detailed analysis of this particular perimeter, and we felt this would be close enough for the purpose of what we are trying to demonstrate here.

Q Now, with that background, would you discuss what the exhibit shows, the exhibits, discussing both of them.

A All right, there is a number of columns there with the heading of time and production rate, flowing bottom hole pressure, cumulative production and center recovery. The production rate, of course, is dictated by the contract itself. One-twentieth of the reserve being produced each year. The reserve in this particular case being calculated from the data we put into the program and the reserves differ slightly from the reserves that are being carried by Natural Gas Pipeline Corporation of America. This particular discrepancy, once again, would not make a significant difference in the ratio

of the two results. The calculation here of the original gas in place, was 26.6 million M.C.F. and I believe this is gas in place with an 89% recovery and Natural Gas carrying something like 26.3 recoverable, so there is approximately a 10% discrepancy.

Q Would that affect your basic calculation?

A It would not affect it, since it would apply to both cases, it would not affect the ratio to no more significant figures than we are considering.

Now, as you go down this, you will note that after sometime during the twelfth year, it is necessary to install a compressor in either case, in order to deliver the D.C.G. now, to point the production from the 640 acre tract is the same. Whether there is one well or two wells, there is absolutely no difference in the income.

There is no increase in the income to be gained by drilling the second well. At this point; if we have one well, the compressor must be installed in 12.64 years, and for two wells it doesn't have to be installed until 12.71 so we gain a few days there, about seven days, but that is twelve years down the road, and present worth on that installation wouldn't be significant. From that point on until sometime during the nineteenth year with the compressor, we would be able to deliver the D.C.G., in either instance.

Decline would begin of one well somewhere after 19.48 years and production would continue economically at the end of 21.41 years. For two wells, this decline would begin after 19.74 and would continue until twenty and a half years, so there is about .9 of a year difference there, so that the entire difference in rate of income would occur after this 19.48 years when the one well would begin to decline. The cumulative production, however, in these two instances would differ by less than 1,000,000 cubic feet for one well, the cumulative being 23,000,879.98 M.C.F. -- excuse me, a million cubic feet, M.M.C.F., and for the two wells, it would be 23,000,880.1 M.M.C.F., so we are talking about a difference in recovery here of less than a million cubic feet, a little over a hundred dollars difference in income.

Q Would it be economic then, to drill two wells to recover that much additional gas?

A Even, assume we would be drilling a well for $155,000.00, Marathon's estimate, obviously would not be economic.

Q Now, their conclusion is based on the assumption that one well will drain at least 640 acres?

A Yes, sir, it is.

Q Now, you heard Mr. Scott's testimony, including his information on pressure tests, permeability of formation

and other factors; taking those factors into consideration in your opinion, will one well drain in excess of 640 acres?

A Yes, sir.

Q Were Exhibits 1 and 2 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: We will offer Exhibits 1 and 2.

MR. NUTTER: Standard's Exhibits 1 and 2 will be admitted in evidence.

(Thereupon Standards' Exhibits 1 and 2 were admitted in evidence)

MR. NUTTER: Does anyone have any questions of Mr. Hull? He may be excused.

(Witness excused)

MR. KELLAHIN: That's all we have, Mr. Nutter.

MR. NUTTER: Does anyone have anything.

MR. FORD: I have a statement.

MR. NUTTER: We will take statements.

MR. FORD: George Ford from Pan American Petroleum Corporation. We concur wholeheartedly with the recommendation of Marathon Oil Company for permanent field rules including 640 acre units for these two pools.

We are alarmed at the Exhibit 7 of Marathon, this shows over eight million dollars for fifty-two additional

wells. That would be unnecessary if we have to develop this reservoir to 320 acre spacing, Pan American operates eight completions in the Indian Basin Upper Penn Pool. Our completions would represent about a million and a quarter dollars of this total amount.

We believe that the other evidence and testimony proves conclusively, that a well would drain over 640 acres in this pool, especially Exhibit 6. This Exhibit shows that at least three wells that were completed after a substantial production started, had a pressure draw-down below the original pressure in the vicinity of their well bores, without any production from those well bores. Now this can be due only to pressure communication over wide areas in the reservoir, that is development on 640 acres, so we respectfully urge the Commission to adopt the present temporary rules and permanent rules for the Indian Basin Upper Penn and Morrow Gas Pools.

Thank you, sir.

MR. KELLAHIN: Mr. Nutter, Standard Oil Company as the witness has stated, has no Morrow wells; however, they are the operator of wells in the Upper Pennsylvanian Pool, and are in support of Marathon Oil Company's presentation for 64-acre spacing in that pool. We feel that it has clearly been tabulated that one well will drain in excess of 640 acres and that the drilling of wells on 320 acres would not only be costly

and unnecessary, but would result in the production of very, very little additional gas, an amount that is almost insignificant and the cost of drilling equipment and connecting up wells would be an economic waste. For that reason, we recommend very strongly the adoption of 640 acre drilling and proration unit for the Indian Basin Upper Pennsylvanian Pool.

Now, as to the Morrow, admittedly, Standard has no wells in that pool. However, we do feel that the testimony shows rather clearly that the production from the Morrow is erratic. That experience has shown that the wells in this particular pool can only be drilled in conjunction with other wells, and in the interest of orderly development and proper development of the pool and, as a matter of fact, in the interest of obtaining any development in the Indian Basin Morrow Pool, the well location drilling and proration unit should be the same for the other horizons in order that the operator might economically dually complete wells in the Morrow.

MR. NUTTER: Thank you. Anyone else?

MR. JORDAN: I have a statement. J. B. Jordan, Union Oil Company of California in Roswell, and I would like to state that Union supports Marathon's application for 640-acre spacing.

MR. NUTTER: Thank you, Mr. Jordan.

MR. ENFIELD: Robert Enfield, and I would like to say

I support Marathon's presentation for both the Upper Penn and the Lower Penn Morrow.

MR. GEDDIE: Ivan D. Geddie, representative of Kerr-McGee Corporation. Kerr-McGee Corporation operates one well in the Indian Basin field and owns an interest in ten others. From our independent study of the Upper Pennsylvanian and Morrow Reservoirs of the Indian Basin field and from evidence which has been presented here at this hearing, our company has come to the conclusion that 640 acre spacing units are proper for these reservoirs. It is therefore recommended that the Conservation Commission establish 640 acre units for gas wells completed in the Indian Basin Upper Penn and Morrow Pools.

MR. NUTTER: Thank you.

MR. GOODMAN: Fred Goodman, of Ralph Lowe Estates and Lowe Drilling Company. We wholeheartedly concur in Marathon's presentation and recommend the adoption of permanent 640 acre spacing.

MR. NUTTER: Mr. Sturdivant?

MR. STURDIVANT: W. C. Sturdivant, for Sun Oil Company. We operate one well and have an interest in eight wells in these pools. We concur with the statements made and recommend adoption of the permanent 640 acre spacing.

MR. NUTTER: Thank you. Any other statements to

the hearing? Mr. Hatch, do you have any correspondence?

MR. HATCH: I have correspondence from Sinclair Oil and Gas, Texaco, Incorporated, Hannigan Oil Company, Texas Pacific, Redfern, Shell, letters from Tidewater and Odessa Natural Gas Company, all in support of the application.

MR. NUTTER: 640 acre spacing is popular in this pool.

MR. COUCH: As a matter of fact, I think it's unanimous.

MR. NUTTER: Is there anything further in Cases 2749 and 2750?

MR. COUCH: A letter from Mr. Curtis Inman supporting the making permanent of the present 640 acre spacing, and spacing rules in both pools. We have also received a telegram from Mr. Hannigan. Does that telegram have about ten different signatures on it?

MR. HATCH: Yes, it does.

MR. COUCH: All right, I have a telegram from Monsanto supporting the recommendations we are making here today, and I have been advised by telephone from my office in Houston that there is a letter from Phillips concurring and supporting our position. I will submit that letter, if I may, later to the Commission records.

MR. NUTTER: That will be fine.

MR. COUCH: I would like to make just one observation that in setting 640 acre spacing for these pools, when it did, in 1963, the Commission has encouraged and made possible the very rapid development and extremely significant gas reserve in the State of New Mexico. In this four years time, there has been an average of approximately one and a half wells drilled a month in this pool area at a substantial expenditure and investment by the operators, and the substantial definition of these pool limits in this four years time can, I think, certainly be attributed very gratefully to the Commission's wisdom in adopting the 640 acre spacing when it did. I would like to say also that in this wide area of thirty-four thousand, sum odd, acres, that our pressure differentials across the field there, are still, other than one or two obviously erratic performing wells, are within a reasonable range of 51 pounds from top to bottom and we strongly urge the Commission that they make permanent the spacing rules contained in the original orders entered in these cases four years ago. Thank you, sir.

MR. NUTTER: Thank you. If there is nothing further in Cases 2749 and 2750, we will take those cases under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JERRY POTTS, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached transcript of hearing was reported by me in stenotype and that the same was reduced to typewritten transcript under my personal supervision and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

Jerry Potts
Notary Public

My Commission Expires:

7-10-70

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2749-2750 heard by me on 2/8, 1967.

..... Examiner
New Mexico Oil Conservation Commission

TIDEWATER OIL COMPANY
BOX 1404, HOUSTON 1, TEXAS
PRODUCTION DEPARTMENT
H. E. BERG, MANAGER
G. H. TRURAN, ASST. MANAGER

February 6, 1967

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

In Re: Cases No. 2749 and 2750
Indian Basin Upper Penn
Gas Pool and Indian Basin
Morrow Gas Pool, Eddy
County, New Mexico

This is regarding the subject cases now set for hearing on 2-8-67. Tidewater Oil Company has working interests in these pools and hereby advises that we concur with the evidence to be submitted by Marathon Oil Company in support of the 640-acre spacing units for each of these pools. We respectfully recommend that 640-acre spacing units be made permanent for both pools.

Very truly yours,

John S. Cameron, Jr.

JSC/nw

cc: Marathon Oil Company
P. O. Box 3128
Houston, Texas 77001
Attn: Mr. J. O. Terrell Couch

ODESSA NATURAL GASOLINE COMPANY
AMERICAN BANK OF COMMERCE BUILDING
POST OFFICE BOX 3908
ODESSA, TEXAS 79760

February 6, 1967

Mr. A. L. "Pete" Porter
Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Re: Examiner Hearing - February 8, 1967
Case 2749, Case 2750

Dear Mr. Porter:

Odessa Natural Gasoline Company is the operator of the Williamson Federal No. 1 well in Section 19, T-21-N, R-23-W, Eddy County, New Mexico and has an interest in other wells in the Indian Basin-Morrow Gas Pool and the Indian Basin-Upper Pennsylvanian Gas Pool.

We will be unable to attend the Examiner Hearing, but we are firmly of the opinion that both of these pools should remain and be developed on the present 640 acre spacing pattern.

Very truly yours,

ODESSA NATURAL GASOLINE COMPANY

Roland L. Hamblin

Roland L. Hamblin
Attorney-In-Fact

RLH:abc
cc: Marathon Oil Company
Midland National Bank Building
Midland, Texas
Attn: Mr. Louis Shearer

cc: J. O. T. Couch, Attorney, Marathon Oil Company
LaFonda Hotel
Santa Fe, New Mexico

Gulf Oil Corporation

ROSWELL PRODUCTION DISTRICT

W. B. Hopkins
DISTRICT MANAGER
M. I. Taylor
DISTRICT PRODUCTION MANAGER
F. O. Mortlock
DISTRICT EXPLORATION MANAGER
H. A. Rankin
DISTRICT SERVICES MANAGER

February 2, 1967

P. O. Drawer 1938
Roswell, New Mexico 88201

Oil Conservation Commission
State of New Mexico
Post Office Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.

Re: Case 2749 (Reopened)
Examiner Hearing, February 8, 1967

Gentlemen:

Gulf Oil Corporation, being a producer in the Indian Basin - Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, recommends that 640-acre spacing be continued for this pool.

We believe one well will efficiently drain 640 acres and to revert to lesser spacing will require the drilling of unnecessary wells, thereby causing economic waste.

Yours very truly,

Gulf Oil Corporation

M. I. Taylor

JHH:bc

I N D I A N B A S I N P O O L A R E A

EDDY COUNTY, NEW MEXICO

	PRIOR TO FEBRUARY 6, 1963		PRESENT FEBRUARY 8, 1967	
	Upper Penn	Morrow	Upper Penn	Morrow
WELLS PENETRATING WITHIN MAP LIMITS	6	5	78	34
WELLS PENETRATING WITHIN UPPER PENN POOL LIMITS	3	3	55	22
WELLS COMPLETED WITHIN UPPER PENN POOL LIMITS	3	2	53	8
WELLS PRODUCING WITHIN UPPER PENN POOL LIMITS	0	0	53	7

February 8, 1967

MARATHON OIL COMPANY

NMOCC CASE NOS. 2749
AND 2750 REOPENED

EXHIBIT 5

Upper Penn reserves:
1.3 trillion Natl Gas PL dedications only.
1.4-15 if So Union wells are incl.

INDIAN BASIN - UPPER PENN POOL

(based on 23 wells)

DATA SHEET

NUMBER OF PRODUCING WELLS	53
ACREAGE WITHIN PRESENT POOL LIMITS	34,677.78 acres

PRODUCTION DATA

Cumulative Gas Production to Jan. 1, 1967	38,912,000 MCF
Cumulative Condensate Production to Jan. 1, 1967	310,500 Bbls.
Cumulative Water Production to Jan. 1, 1967	142,200 Bbls.

2 old wells only - no plant liquids

CORE AND LOG DATA

Porosity from Cores (7 wells)	4.32%
Porosity from Logs	4.50%
Permeability from Cores	46.3 md.
Connate Water Saturation	Approx. 25%

FLUID DATA

Gas Specific Gravity	0.65
Compressibility - Z Factor	0.84
Condensate Gravity	59° API at 60° F
Approximate Condensate Yield	8 Bbls./MMCF

RESERVOIR DATA

Original Reservoir Pressure (Datum: -3640')	Approx. 2917 psig.
Reservoir Temperature	146° F
Gas-Water Contact	Est. -3770 Feet

February 8, 1967

MARATHON OIL COMPANY

NMOCC CASE NOS. 2749
AND 2750 REOPENED

EXHIBIT 4

24,868 MMcf Nat'l Gas.
28971 MMcf incl So Union.
based on 9 wells

INDIAN BASIN - MORROW GAS POOL

1,106 MMcf for 1 well not compl in Morrow.

ECONOMICS

WELL COST OF A TYPICAL MORROW SINGLE COMPLETION—NO ATTEMPT TO COMPLETE IN UPPER PENN	$ 200,000
WELL COST OF A TYPICAL MORROW SINGLE COMPLETION—UNSUCCESSFUL ATTEMPT TO COMPLETE IN UPPER PENN	$ 210,000
WELL COST OF A TYPICAL MORROW AND UPPER PENN DUAL COMPLETION	$ 257,000
ADDITIONAL COST TO DUAL IN MORROW ABOVE UPPER PENN SINGLE COMPLETION COST	$ 102,000
ESTIMATED CHANCE FOR SUCCESSFUL COMPLETION IN MORROW	33%

Est. Gas [illegible] 1-2 billion cu ft. [illegible]

16.5¢/MCF
2.75/bbl cond., less trucking
2.54

February 8, 1967

MARATHON OIL COMPANY

NMOCC CASE NOS. 2749
AND 2750 REOPENED

EXHIBIT ____

MARATHON OIL COMPANY

PRODUCTION - UNITED STATES AND CANADA

HOUSTON DIVISION

J. O. TERRELL COUCH
DIVISION ATTORNEY

WARREN B. LEACH, JR.
WILLIAM H. HOLLOWAY
ALLEN McMURREY
ATTORNEYS

'67 FEB 13 AM

SOUTHERN NATIONAL BANK BUILDING
P. O. BOX 3128
HOUSTON, TEXAS 77001

February 10, 1967

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

File

Att. Mr. Dan Nutter

Dear Dan:

Re: NMOCC Cases Nos. 2749 and 2750 (Reopened) - Indian Basin Area - Eddy Co., New Mexico

Reopened

I enclose for the record in the above numbered cases, the letter dated February 2, 1967 from Phillips Petroleum Company stating support for Marathon's recommendation that the 640-acre spacing rules be made permanent for both pools.

I enjoyed the opportunity to visit with you and other members of the staff while I was in Santa Fe this week.

Very truly yours,

J. O. TERRELL COUCH

JOTC/1
encl
Air Mail

PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA 74004

EXPLORATION AND PRODUCTION DEPARTMENT

February 2, 1967

Indian Basin Gas Field, Eddy County, New Mexico - Field Rules

Marathon Oil Company
P. O. Box 552
Midland, Texas

Gentlemen:

Reference is made to the hearing set for February 8, 1967, before the New Mexico Commission for the purpose of further considering the matter of spacing in the Indian Basin-Upper Pennsylvanian and Morrow Gas Fields, Eddy County, New Mexico. This hearing is docketed under Case No's. 2749 and 2750.

It is the understanding of this office that Marathon plans to appear at the hearing and will recommend that the temporary 640 acre spacing for each of these reservoirs be adopted on a permanent basis. Phillips Petroleum Company as an interest owner in wells in these fields supports this proposed recommendation and is willing to be so quoted by your representative at the hearing on February 8, 1967.

Yours very truly,

Shofner Smith
Production Director

JRB:dg

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

P. O. BOX 2088
SANTA FE

February 13, 1967

Re: Case No. 2749 2750
Order No. R-2440-A & R-2441-A
Applicant:
RALPH LOWE

Mr. Terrell Couch
Marathon Oil Company
Post Office Box 3128
Houston, Texas

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC
Other Jason Kellahin, J. B. Jordan, Ivan Geddie, George Ford, Fred Goodman, W. C. Sturdivant and Robert Enfield

PROG-GASPAC NO-40200 JOB NO- PR 417 REQ BY--RMD DATE-02/06/67

INDIAN BASIN GAS WELL SPACING -640 AC

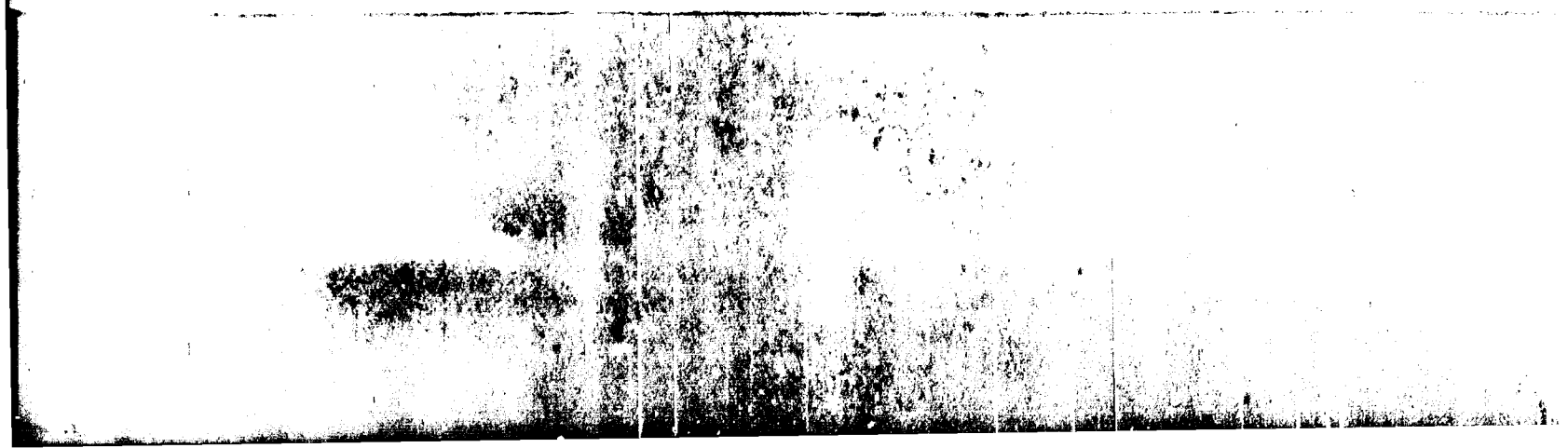
FROM 1 STD WELL WHICH HAS AN AVE POTENTIAL.

SPACING	NET PAY THICKNESS	POROSITY	WATER SATURATION	PERMEABILITY	INITIAL RESERVOIR PRESSURE	RESERVOIR TEMPERATURE
1. WELLS ON 640.0 ACRES	142.00 FEET	0.045	0.250	46.30 MD	2932. PSIA	146. DEGREES F

GAS VISCOSITY	WELL BORE RADIUS	CONTRACT TIME	PRESSURE BASE	TEMPERATURE BASE	BHP WHEN COMPRESSORS ARE INSTALLED	GAS DEVIATION FACTOR	FRACTION W
0.0150 CP	3.38 INCHES	20.00 YEARS	15.03	60. DEGREES F	1250. PSIA	0.84	0.87500

VALUE OF GAS	TAX RATE	COMPRESSION CHARGES	WELL OPERATING COST	COMP. MAINTENANCE CHARGES
0.166 DOLLARS PER MCF	0.050000	0.04 DOLLARS PER MCF	8.00 DOLLARS PER DAY	2.00 DOLLARS PER DAY

TIME IN YEARS	TIME IN DAYS	PROD. RATE IN MCFPD	FLOWING BHP IN PSIA	CUML. PROD. IN MMCF	PERCENT RECOVERY
0.	0.	3274.1	2924.	0.	0.
1.00	365.	3274.1	2792.	1195.03	4.5
2.00	730.	3274.1	2660.	2390.06	9.0
3.00	1095.	3274.1	2528.	3585.09	13.5
4.00	1460.	3274.1	2396.	4780.11	18.0
5.00	1825.	3274.1	2264.	5975.14	22.4
6.00	2190.	3274.1	2132.	7170.17	26.9
7.00	2555.	3274.1	1999.	8365.20	31.4
8.00	2920.	3274.1	1867.	9560.23	35.9
9.00	3285.	3274.1	1734.	10755.26	40.4
10.00	3650.	3274.1	1602.	11950.29	44.9
11.00	4015.	3274.1	1469.	13145.32	49.4
12.00	4380.	3274.1	1336.	14340.34	53.9
INSTALL COMPRESSORS AT 4614. DAYS OR 12.64 YEARS					
13.00	4745.	3274.1	1202.	15535.37	58.3
14.00	5110.	3274.1	1068.	16730.40	62.8
15.00	5475.	3274.1	934.	17925.43	67.3
16.00	5840.	3274.1	798.	19120.46	71.8
17.00	6205.	3274.1	661.	20315.49	76.3
18.00	6570.	3274.1	521.	21510.52	80.8
19.00	6935.	3274.1	374.	22705.54	85.3
19.48	7109.	3274.1	300.	23275.25	87.4



PRODUCTION RATE DECLINES FROM 7109. DAYS OR 19.48 YEARS

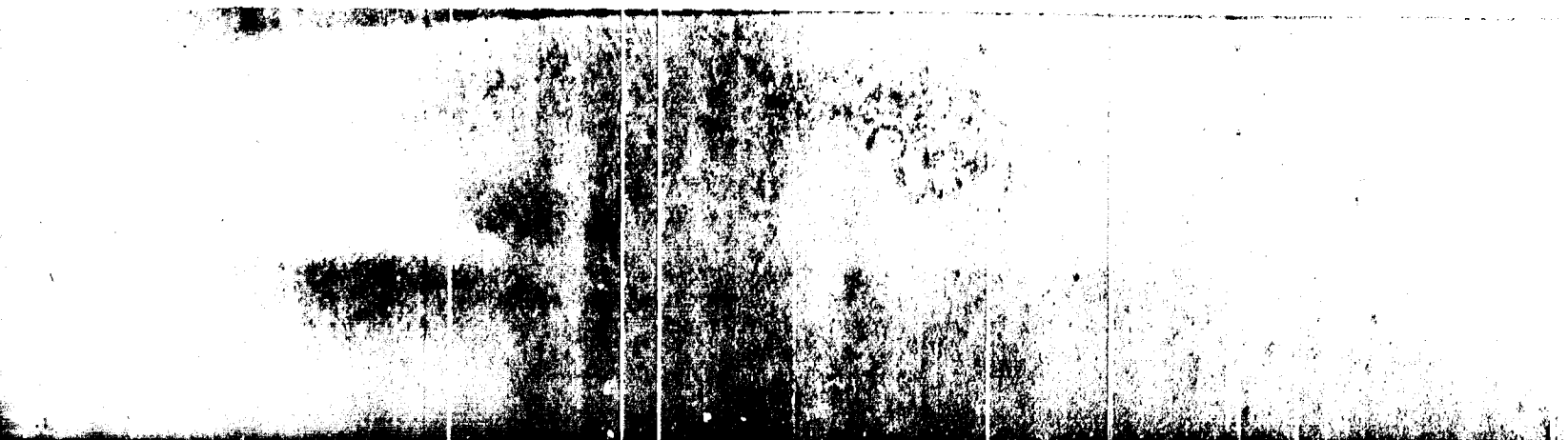
21.41	7813.	97.1	300.	23879.98	89.7

ORIGINAL GAS IN PLACE, 26624.80 MMCF

JOB COMPLETED.

26.6 million MCF

Natural Gas, carries 26.3 million MCF as recoverable reserves/std



PROG-GASPAC NO-40200 JOB NO- PR 417 REQ BY-RMD DATE-02/06/67
INDIAN BASIN GAS WELL SPACING -320 AC

SPACING	NET PAY THICKNESS	POROSITY	WATER SATURATION	PERMEABILITY	INITIAL RESERVOIR PRESSURE	RESERVOIR TEMPERATURE
2. WELLS ON 640.0 ACRES	142.00 FEET	0.045	0.250	46.30 MD	2932. PSIA	146. DEGREES F

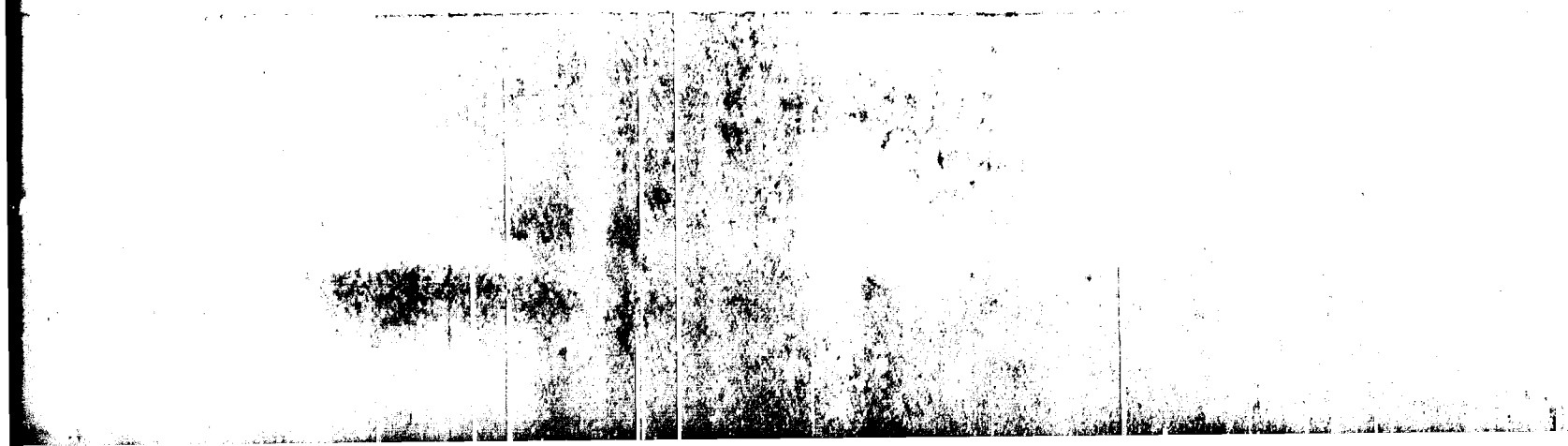
GAS VISCOSITY	WELL BORE RADIUS	CONTRACT TIME	PRESSURE BASE	TEMPERATURE BASE	BHP WHEN COMPRESSORS ARE INSTALLED	GAS DEVIATION FACTOR	FRACTION WI
0.0150 CP	3.38 INCHES	20.00 YEARS	15.03	60. DEGREES F	1250. PSIA	0.84	0.87500

VALUE OF GAS	TAX RATE	COMPRESSION CHARGES	WELL OPERATING COST	COMP. MAINTENANCE CHARGES
0.166 DOLLARS PER MCF	0.050000	0.04 DOLLARS PER MCF	8.00 DOLLARS PER DAY	2.00 DOLLARS PER DAY

TIME IN YEARS	TIME IN DAYS	PROD. RATE IN MCFPD	FLOWING BHP IN PSIA	CUML. PROD. IN MMCF	PERCENT RECOVERY
0.	0.	3274.1	2928.	0.	0.
1.00	365.	3274.1	2796.	1195.03	4.5
2.00	730.	3274.1	2665.	2390.06	9.0
3.00	1095.	3274.1	2533.	3585.09	13.5
4.00	1460.	3274.1	2401.	4780.11	18.0
5.00	1825.	3274.1	2269.	5975.14	22.4
6.00	2190.	3274.1	2137.	7170.17	26.9
7.00	2555.	3274.1	2005.	8365.20	31.4
8.00	2920.	3274.1	1873.	9560.23	35.9
9.00	3285.	3274.1	1741.	10755.26	40.4
10.00	3650.	3274.1	1609.	11950.29	44.9
11.00	4015.	3274.1	1477.	13145.32	49.4
12.00	4380.	3274.1	1345.	14340.34	53.9

INSTALL COMPRESSORS AT 4641. DAYS OR 12.71 YEARS

13.00	4745.	3274.1	1212.	15535.37	58.3
14.00	5110.	3274.1	1079.	16730.40	62.8
15.00	5475.	3274.1	946.	17925.43	67.3
16.00	5840.	3274.1	813.	19120.46	71.8
17.00	6205.	3274.1	679.	20315.49	76.3
18.00	6570.	3274.1	543.	21510.52	80.8
19.00	6935.	3274.1	405.	22705.55	85.3
19.74	7203.	3274.1	300.	23584.55	88.6



PRODUCTION RATE DECLINES FROM 7203. DAYS OR 19.74 YEARS

20.50	7481.	194.2	300.	23880.81	89.7

ORIGINAL GAS IN PLACE, 26624.80 MMCF

JOB COMPLETED.

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 2
CASE NO. 2750

Docket No. 4-67

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 8, 1967

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Elvis A. Utz, Alternate Examiner:

CASE 3523: Application of Aztec Oil & Gas Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Fed."M" Well No. 1 located in Unit L of Section 27, Township 18 South, Range 33 East, Lea County, New Mexico, to produce oil from the South Corbin-Strawn Pool and to produce gas from the South Corbin-Morrow Gas Pool through parallel strings of tubing.

CASE 3524: Application of Standard Oil Company of Texas for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the San Andres formation through its H. R. Stroup Well No. 6 located in Unit C of Section 11, Township 18 South, Range 26 East, Atoka-San Andres Pool, Eddy County, New Mexico.

CASE 3261 (Reopened)

In the matter of Case No. 3261 being reopened pursuant to the provisions of Order No. R-2931-B, which order assigned a 160-acre proportional factor of 4.77 to the Jenkins-Cisco Pool, Lea County, New Mexico, for a period of six months, rather than the usual factor of 6.77 for a 160-acre pool of this depth. All interested parties may appear and show cause why the 160-acre proportional factor of 4.77 assigned to said pool should not be retained.

CASE 2750 (Reopened)

In the matter of Case No. 2750 being reopened pursuant to the provisions of Order No. R-2441, which order established 640-acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool. All interested parties may appear and show cause why said pool should not be developed on 320-acre spacing units.

CASE 2749 (Reopened)

In the matter of Case No. 2749 being reopened pursuant to the provisions of Order No. R-2440, which order established 640-acre spacing units for the Indian Basin-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool. All interested parties may appear and show cause why said pool should not be developed on 320-acre spacing units.

CASE 3525: Application of Robert A. Dean for a non-standard gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the non-standard gas well location of his Southern Union 13 State Well No. 1, 2310 feet from the South and East lines of Section 13, Township 16 South, Range 31 East, West Mesa-Upper Queen Gas Pool, Eddy County, New Mexico.

CASE 3526: Application of Mobil Oil Company for 320-acre spacing, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks 320-acre spacing for the Cemetery-Morrow Gas Pool in Sections 16 and 17, Township 20 South, Range 25 East, Eddy County, New Mexico. Said pool was created prior to Order No. R-2707 and therefore is not automatically eligible for 320-acre spacing. In the absence of evidence to the contrary, 320-acre spacing will be established for the subject pool.

Docket No. 4-67

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 8, 1967

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

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CASE 3524: Application of Standard Oil Company of Texas for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the San Andres formation through its H. R. Stroup Well No. 6 located in Unit C of Section 11, Township 18 South, Range 26 East, Atoka-San Andres Pool, Eddy County, New Mexico.

CASE 3261 (Reopened)

In the matter of Case No. 3261 being reopened pursuant to the provisions of Order No. R-2931-B, which order assigned a 160-acre proportional factor of 4.77 to the Jenkins-Cisco Pool, Lea County, New Mexico, for a period of six months, rather than the usual factor of 6.77 for a 160-acre pool of this depth. All interested parties may appear and show cause why the 160-acre proportional factor of 4.77 assigned to said pool should not be retained.

CASE 2750 (Reopened)

In the matter of Case No. 2750 being reopened pursuant to the provisions of Order No. R-2441, which order established 640-acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool. All interested parties may appear and show cause why said pool should not be developed on 320-acre spacing units.

CASE 2749 (Reopened)

In the matter of Case No. 2749 being reopened pursuant to the provisions of Order No. R-2440, which order established 640-acre spacing units for the Indian Basin-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool. All interested parties may appear and show cause why said pool should not be developed on 320-acre spacing units.

CASE 3525: Application of Robert A. Dean for a non-standard gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the non-standard gas well location of his Southern Union 13 State Well No. 1, 2310 feet from the South and East lines of Section 13, Township 16 South, Range 31 East, West Mesa-Upper Queen Gas Pool, Eddy County, New Mexico.

CASE 3526: Application of Mobil Oil Company for 320-acre spacing, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks 320-acre spacing for the Cemetery-Morrow Gas Pool in Sections 16 and 17, Township 20 South, Range 25 East, Eddy County, New Mexico. Said pool was created prior to Order No. R-2707 and therefore is not automatically eligible for 320-acre spacing. In the absence of evidence to the contrary, 320-acre spacing will be established for the subject pool.

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF CASE NO. 2749 BEING REOPENED PURSUANT TO THE PROVISIONS OF ORDER NO. R-2440, WHICH ORDER ESTABLISHED 640-ACRE SPACING UNITS FOR THE INDIAN BASIN-UPPER PENNSYLVANIAN GAS POOL, EDDY COUNTY, NEW MEXICO	)	No. 2749 (Reopened)

ENTRY OF APPEARANCE

The undersigned, Atwood & Malone of Roswell, New Mexico, a firm of attorneys whose members are duly licensed to practice law in the State of New Mexico, hereby enters its appearance in this cause as New Mexico counsel for Marathon Oil Company.

DATED at Roswell, New Mexico, this 3rd day of February, 1967.

ATWOOD & MALONE

By _____
Attorneys for Marathon Oil Company
Post Office Drawer 700
Roswell, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

IN THE MATTER OF CASE NO. 2750 BEING REOPENED PURSUANT TO THE PROVISIONS OF ORDER NO. R-2441, WHICH ORDER ESTABLISHED 640-ACRE SPACING UNITS FOR THE INDIAN BASIN-UPPER PENNSYLVANIAN GAS POOL, EDDY COUNTY, NEW MEXICO.	)	No. 2750 (Reopened)

ENTRY OF APPEARANCE

The undersigned, Atwood & Malone of Roswell, New Mexico, a firm of attorneys whose members are duly licensed to practice law in the State of New Mexico, hereby enters its appearance in this cause as New Mexico counsel for Marathon Oil Company.

DATED at Roswell, New Mexico, this 3rd day of February, 1967.

ATWOOD & MALONE

By _____
Attorneys for Marathon Oil Company
Post Office Drawer 700
Roswell, New Mexico

DRAFT
GMH/esr

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:

CF Subj. _____

CASE No. 2749

Order No. R-2440-A

APPLICATION OF RALPH LOWE TO CREATE A NEW POOL FOR UPPER PENNSYLVANIAN GAS PRODUCTION AND FOR SPECIAL POOL RULES, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 8, 1967, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of February, 1967, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2440, dated February 28, 1963, Special Rules and Regulations were promulgated for the Indian Basin-Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year from the date of first pipeline connection.

(3) That pursuant to the provisions of Order No. R-2440, this case was reopened to allow the operators in the subject pool to appear and show cause why the Indian Basin-Upper Pennsylvanian Gas Pool should not be developed on 320-acre spacing units.

(4) That the evidence establishes that one well in the Indian Basin-Upper Pennsylvanian Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2440 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2440 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Indian Basin-Upper Pennsylvanian Gas Pool, promulgated by Order No. R-2440,are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

DRAFT
GMH/esr

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:

CF Subj. _____

CASE No. 2750

Order No. R-2441-A

APPLICATION OF RALPH LOWE
TO CREATE A NEW POOL FOR
MORROW GAS PRODUCTION AND
FOR SPECIAL POOL RULES,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 8, 1967, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of February, 1967, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2441, dated February 28, 1963, Special Rules and Regulations were promulgated for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year from the date of first pipeline connection.

(3) That pursuant to the provisions of Order No. R-2441, this case was reopened to allow the operators in the subject pool to appear and show cause why the Indian Basin-Morrow Gas Pool should not be developed on 320-acre spacing units.

(4) That the evidence establishes that one well in the Indian Basin-Morrow Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2441 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2441 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Indian Basin-Morrow Gas Pool, promulgated by Order No. R-2441, are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 8, 1967

EXAMINER HEARING

IN THE MATTER OF:

Case 2750 reopened pursuant to the provisions of Order No. R-2441, which order established 640 acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico

Case 2749 reopened pursuant to the provisions of Order No. R-2440, which order established 640 acre spacing units for the Indian Basin Upper Pennsylvanian Gas Pool, Eddy County, New Mexico

Case No. 2750
2749

BEFORE:

Daniel S. Nutter, Examiner

Transcript of Hearing

MR. NUTTER: We will call Case 2750.

MR. HATCH: Case 2750, reopened. In the matter of Case 2750 being reopened pursuant to the provisions of Order No. R-2441, which order established 640 acre spacing units for the Indian Basin-Morrow Gas Pool, Eddy County, New Mexico, for a period of one year after the first pipe line connection in the pool.

MR. COUCH: Terrell Couch, appearing for Marathon Oil Company. Mr. Examiner, does the Commission's files contain a letter from Atwood and Malone, signed by Ross Malone entering their appearance? And in association with Mr. Malone, we are entering our appearance in the case here.

MR. NUTTER: Yes, sir, we do have that letter.

MR. COUCH: I would like to request that Case 2749 be consolidated with Case 2750 for the purpose of hearing.

MR. NUTTER: At this time, we will call Case 2749.

MR. HATCH: Case 2749 reopened. In the matter of Case 2749 being reopened pursuant to the provisions of Order No. R-2440, which Order established 640 acre spacing units for the Indian Basin Upper Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year after first pipeline connection in the pool.

MR. NUTTER: For the purpose of testimony, Case No. 2749 and Case No. 2750 will be consolidated. We would

like to call for appearances in these cases at this time.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, appearing on behalf of Standard Oil Company of Texas. We don't know right at the moment whether we will offer any testimony or not. We may want to put on one witness.

MR. JORDAN: J. B. Jordan, Union Oil Company of California. I wish to make a statement that Union supports Marathon's application for 640 acre spacing.

MR. NUTTER: Where are you located?

MR. JORDAN: At Roswell.

MR. NUTTER: Union in Roswell?

MR. JORDAN: Right.

MR. GEDDIE: Ivin Geddie, I-v-i-n G-e-d-d-i-e, representing Kerr-McGee Corporation, Oklahoma City.

MR. FORD: George H. Ford, Fort Worth, Texas, I'll have a closing statement, appearing for Pan American Petroleum Corporation.

MR. GOODMAN: Fred G. Goodman, Midland, representing Ralph Lowe Estates and Lowe Drilling Company. We highly recommend and concur with Marathon's request for the permanent 640-acre spacing.

MR. STURDIVANT: W. C. Sturdivant, Jr., Dallas, Texas, Sun Oil Company.

MR. NUTTER: Is that S-t-u-r-d-i-v-a-n-t?

MR. STURDIVANT: Right. We anticipate making a statement at the conclusion.

MR. NUTTER: Mr. Kellahin's appearance was for Standard Oil Company, was it not? I believe that's all Mr. Couch, would you proceed?

MR. COUCH: Mr. Nutter, Marathon Oil Company is the operator of twenty wells on a producing status and one temporarily abandoned in the Upper Penn Indian Basin Gas Pool and is also the operator of several wells in the Morrow Gas Pool. It would be our recommendation that the existing spacing rules for each of these pools be made permanent, including 640-acre spacing units. We will have one witness, Mr. Robert Scott, whom I would like to have sworn at this time.

(Witness sworn)

ROBERT SCOTT, called as a witness on behalf of the Applicant, having first been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, will you please state your name and by whom you are employed and in what capacity?

A My name is Robert P. Scott, and I'm employed by Marathon Oil Company as staff engineer in our Houston Division Office. I have been employed by Marathon some fifteen years.

Q Mr. Scott, have you previously testified before the New Mexico Oil Conservation Commission or its examiners and are your qualifications a matter of record?

A Yes, they are.

MR. COUCH: Are the qualifications of the witness acceptable?

MR. NUTTER: Yes, sir.

Q (By Mr. Couch) Mr. Scott, will you please state briefly the history of each of these fields, their time of discovery and general location?

A The Indian Basin Upper Penn and Indian Basin-Morrow Gas Pools were discovered by drilling of the wells which now operates as Marathon Indian Basin Gas Comp. Well No. 1 in Section 23, Township 21, South Range 23 East. This well, at the time of its drilling, was operated by Ralph Lowe interest as the Indian Basin Well No. 1. The field area generally is approximately twenty miles west, northwest of Carlsbad, and twenty miles southwest of Artesia. Both of these pools are of Pennsylvanian age.

Q At the original spacing hearing held for each of these pools in February of 1963, how were the vertical limits of the pools defined at that time?

A At that time, a log of the discovery well was entered and the vertical limits were described by the

representatives for Ralph Lowe as being from about 7453 feet there for the Upper Penn, 7453 to 8054; for the Morrow as described from about 8949 -- 8945 to 9442 feet.

Q Mr. Scott, I will ask you to look at what has been marked Marathon Oil Company's Exhibit No. 1 in these two cases and tell us what type log that is on the left side of that Exhibit?

A The top log on the left hand side of the Exhibit 1 is the log of the same well which was, at the previous hearing, referred to as the Ralph Lowe Indian Basin Well No. 1.

Q All right, sir, now I notice on that log there is an interval colored in purple in the upper 7400 feet range and a portion colored in orange on the left side of the log down in the 9,000 foot range?

A Yes, sir, those represent the perforated intervals for the two completions in that well, the purple being the Upper Penn, the orange being the Morrow perforations.

Q All right, now, generally describe for us Exhibit 1, what it portrays, please.

A Well, sir, our Exhibit 1, which I will refer to as an ownership map, shows on it five separate unitized areas. These are outlined in green. Those are North Indian Basin units.

Q This is at the north end of the map up there?

A Yes, sir.

Q The north central part of the map?

A North central part of the map.

Q All right.

A Then toward the right-hand side of the map to the East, is the Indian Hills Unit; directly below is the Walt Canyon Unit; then over on the bottom of the map of the west top portion is the Bogle Flats Unit. Above and toward the top and on just to the left of the North Indian Basin is the west Indian Basin unit.

Q All right, now, I notice there are a lot of red colored areas there on this map, or red boundary areas; will you say what those represent?

A Yes, sir, those red border sections represent -- there are thirty-five of those red border sections, thirty-four of those are sections which have been communitized for the purpose of development under the temporary 640-acre spacing rules. There is one of these red border sections, where the lease name, or the section name has the term "comp" in it. This is the Bogle Flats Unit, Gas Comp in Section 8 of Township 22 South Range 23 East.

Q Excuse me, sir, isn't that in Section 5, but it is Well Number 8?

A That's right, Section 5, Well Number 8.

Q As a matter of legal interpretation, if I can interpose here, this Section was created as a drilling unit by virtue of the provisions of the Bogle Flats Unit agreement, is that your understanding?

A That's right, that's my understanding.

Q It was not separately communitized by a separate communitization unit, but we show it in red because of the name of the well being "Gas Comp", which indicates communitization?

A Yes, sir.

Q As a matter of fact, there are three other sections within the Bogle Flats Unit that are in substantially the same status, is that right?

A Yes, sir.

Q It would be Sections 9, 16 and 17?

A That is my understanding.

Q All right, sir.

A I would point out the legend at the bottom of the page indicates the green, the usage of green border on the red border. Also, in the legend there, you will see that the Indian Basin Upper Penn Gas Pool well is shown by having the purple circle over the well spot. The Indian Basin-Morrow completions are, which are together with the Upper Penn, indicated by having the well spots colored in the orange.

When using the colors, the orange refers to the Morrow.

Q All right, now, by each of those well spots, you have a date and then a "TD", what is that date on each of the wells, please sir?

A Yes, sir, the dates are the date of completion, the depths are the total depths of the wells.

Q All right, now, I will ask you to look at what has been marked Marathon Oil Company's Exhibit 2; all right, will you state briefly what is depicted by the colors on this map, Mr. Scott?

A Exhibit 2 which I will refer to as the Pool Limit map, the colors here, the purple boundary represents the present horizontal limit of the Indian Basin Upper Penn Gas Pool. The orange border area indicates the horizontal limit of the Indian Basin-Morrow Gas Pool.

MR. NUTTER: As designated?

THE WITNESS: As designated by the Commission.

Q (By Mr. Couch) This is the same base map as Exhibit 1?

A Same base map, same log on the left.

Q So the blue line information on here is the same as Exhibit 1?

A That's right.

Q I notice several little orange semi-circles around

quite a few wells outside the perimeter of the Morrow Gas Pool, Indian Basin Gas Pool.

A This orange semi-circle has been used -- now this is within the Upper Penn Pool Limits, and it does include two wells inside the Morrow Pool Limit. This orange semi-circle has been used to indicate a well that was drilled to the Morrow but found dry. There are some fourteen of those dry Morrow tests shown within the Upper Penn Pool Limits.

Q What is the total acreage as computed, of the fifty-four sections within the present limits?

A The Indian Basin Upper Penn contain fifty-four sections within the designated pool limits and contain some 34,677,78 acres, approximately.

Q All right, and what is the acreage in Continental Indian Basin-Morrow Pool Limit?

A The Morrow Pool Limit includes some 7,035,26 acres, approximately. The well spot colors here are the same as they were on the first map, on Exhibit 1.

Q All right, now, these dry holes in the Morrow substantially surround, or in the Upper Penn it shows some dry hole symbols around that perimeter. Do you know --

A Around the orange bordered area being the Upper Pennsylvanian Pool Limits --

Q You said around the orange, you mean around the

purple?

A Around the purple bordered area, being in the first row of the section around that purple border, there have been some fifteen dry holes drilled. These dry holes do substantially surround the present horizontal pool limits and they do at this time reasonably well define the pool limits.

Q Are the pool limits of the Upper Pennsylvanian Pool constructurally controlled?

A There is some constructural relief here, they have lithologic changes which control a good portion, substantial portion of the pool limits.

Q This would include the gas-water contact in part of the area around there?

A Gas-water contact in part of the area and lithologic change over other parts of the area.

Q You are not testifying about the entire limits of this pool are you?

A No, the entire limits are not either controlled by water or by lithology. It is a combination of the two.

Q As a matter of fact, they are only presently drilling wells outside the pool limits, is that right?

A Yes, sir, Marathon drills in Section 17, Township 21 South Range 24 East, this well we are calling the Indian Hill Unit Gas Comp-A Well No. 6.

Q Would you expect that some additional drilling might occur around the present pool limits?

A It's possible some may occur around the pool limits.

Q What is your feeling about whether the reservoir limits are reasonably defined at this time?

A Substantially defined, that in addition to one well being drilled, there may be others.

Q All right, now, I ask you to look at what has been marked Marathon's Exhibit No. 3. How would you identify that Exhibit, Mr. Scott?

A This is a data sheet, a development data sheet for the Indian Basin Pool Area.

Q Does it show the state of development at the time of discovery and the spacing hearing in February, '63?

A Yes, sir, there are two groups of data here, one being the development prior to February 6th, 1963, which was the date of the previous spacing hearing, the other on the right-hand side being the present, February 8th, 1967.

Q Approximately four years between those two dates?

A Yes, sir.

Q All right, let's just briefly run through those tabulations of the development. Shown on the first line, from the left to the right, across the page, is "wells penetrating within the map limits".

A The first line does represent the well penetrating within the limits of this map.

Q You are pointing at Exhibit No. --

A Exhibit No. 2, this being the same map we used in the other. It shows that on February 6th, 1963, there had been six wells within the map limits that penetrated the Upper Penn, five of these had penetrated the Morrow. Now, some four years later there have been within these map limits some seventy-eight wells drilled penetrating the Upper Penn, thirty-four of which have been carried to the Morrow.

Q Those figures are accumulated around this and they include the six and five?

A Yes, they do include --

Q Is the same thing true of the other figures you are going to give?

A Yes.

Q All right, looking across to the second column, from left to right --

A The second column shows wells penetrating within the present Upper Penn Pool Limits. This is the purple bordered area on Exhibit 2. At the time of the previous spacing hearing on February 6th, 1963, there had been three wells within this purple border that penetrated the Upper Penn, and there had been three wells which penetrated the Morrow. Now, some four

years later within this purple border, there have been fifty-five penetrate the Upper Penn, twenty-two of which penetrated the Morrow.

Going on now to the next line across, this shows wells that were completed within the Upper Penn Pool Limits. On February 6th, '63, there were three wells that had been completed in the Upper Penn, two had been completed in the Morrow. Now, four years later, there have been fifty-three wells completed in the Upper Penn and eight completed in the Morrow.

Now, the last line across there at the bottom, is wells producing within the Upper Penn Pool Limit. At the time of February 6th, '63, there was no pipeline connection to the area, so there were no wells producing. Now, there are fifty-three Upper Penn wells producing and seven Morrow.

Q All right, now, directing your attention specifically toward the Upper Penn Pool and looking at what has been marked as Marathon Oil Company's Exhibit No. 4, will you please discuss that Exhibit, identify it, and discuss it for us?

A Marathon's Exhibit 4 is a data sheet on the Indian Basin Upper Penn Pool, just the Upper Penn. This data sheet shows the number of presently producing wells as fifty-three; it shows the acreage within the present pool limits that I started a minute ago. Below that then, is some production data.

This is cumulative gas produced to January 1st, 1967. This shows a volume of some 38,912,000,000 cubic feet. The next line shows cumulative condensate production to January 1st, 1967, to be some 310,500 barrels. The cumulative water production shown, that is to January 1st, '67, was 142,000 barrels.

Q Mr. Scott, the source of that information, I see the figures appear to be rounded off, that's correct, isn't it?

A Yes, these are slightly rounded numbers.

Q Where did you obtain those?

A Those numbers were taken from the engineering committee's statistical report, with December's production, being gotten from other productions, so they were rounded --

Q All right, going on with Exhibit 4, the next group of data.

A I would point out one thing here. The condensate production figure does not include any planned product.

MR. NUTTER: Field condensate only?

THE WITNESS: Yes, sir. The next group of data is core and log data. We have there two porosities. The data for the first one, is porosity from cores, these are cores that we had available to us on seven wells. Here we contended that the porosity below 2% didn't represent pay. The average

porosity from the cores on the seven wells waited for the final sample information, which was 4.32%.

Now, the second figure for porosity, the porosity value that has been obtained from logs, all the logs in the field that we had available to us, which is all the logs. This figure is 4.50% porosity. The next line represents the permeability, the permeability from cores. This is the same seven wells for which we calculated a porosity from the cores. The permeability weighted average 46.3 millidarces. The range of permeability for these same pays was 3,150 millidarces, down to 0.1 millidarcies.

Q And again you only consider the permeability where you had porosity?

A This is for the same pay that had 2% or better porosity. The last line there under, is connate water saturation, and as calculated from the logs, showed approximately 25%.

Q All right, sir, going on to fluid data?

A Fluid data presented here for the Upper Penn is this: gas specific gravity, 0.65, compressibility z factor 0.84 condensate gravity, 59 A P I at 60°F, approximate condensate yield is 8 barrels per MMCF.

Q All right, now, then, the reservoir data that appears in the last group?

A Under reservoir data, the first line represents my estimate of the original reservoir pressure data of a minus 3640. There is an approximate figure of 2917 PSIG. There were pressures higher than this measured. I can think of two immediately, one, 2940 and there was one recorded as high as 2952, that I can recall. This 2917 PSIG approximate original reservoir pressure is a minimum in my estimates.

Q All right, now, your reservoir temperature?

A Reservoir temperature, 146° F.

Q You show the gas-water contact. Is that intended to be exact or specific?

A No, sir, from the drilling and production data that was available to us, we have estimated gas-water contact as a -3770.

Q All right, please look now at what is marked Marathon's Exhibit 5. Again, Mr. Scott, you used the same base map as Exhibits 1 and 2?

A Yes, sir, same base map.

Q You've got a different color scheme here?

A Completely different color scheme.

Q Will you please identify and describe Exhibit 5 for us.

A On Exhibit 5 we have presented all of the bottom-hole pressure data that was available to Marathon through

January of '67. These bottom-hole pressure measurements are printed on this map in three different colors. You will notice on the legend at the bottom of the page, the orange color is used to indicate the pressure that was taken in the period prior to March 1, '66.

Q Now, why did you cut it off and use one color up to that date, Mr. Scott?

A We considered that prior to March 1st, '66 there had not been a very substantial amount of production from the field at that time.

Q A gas plant handled the main volume of the field and it went on stream in February, '66, didn't it, or late January?

A Yes, Southern Union had been taking some gas since August of '65, but this was a fairly small volume in relation to the total taken from the field prior to that time. The Indian Basin Plant went on, January 26th, 1966. There were start-up difficulties and it was approximately March 1st before we had a really substantial, substantially settled production.

Q All right, then, the next coloring of pressure data there is in red and that covers what period?

A The red bottom-hole pressure points were taken in the period from March 1st, 1966, to August 1st, 1966.

Q And then you have some in green?

A Yes, sir, the green figures for bottom-hole pressures were taken during August of 1966.

Q Mr. Scott, in relation, then, to the pressures for which data is shown on Marathon's Exhibit 5, were some of these pressures just taken from C-122's, some of these pressures, and this is disregarding the time periods here.

A Some of these pressures were taken from U.S.G.S. Reports.

Q That is reports to the U.S.G.S.?

A To the U.S.G.S. Some were taken from 122's where a bomb was run in where P Sub C was reported.

Q It appeared that way from the C-122?

A Yes, sir.

Q Now, some other pressures, you got directly from another rate?

A Yes, sir, we had actually bottom-hole pressure measurements and we used here all bottom-hole pressures where we knew there was established twenty-four hour shut-in.

Q And you didn't use other pressure data, such as drillstem pressure or things of this nature?

A No, sir, drillstem test pressures do not appear here at all.

Q Why did you select to use the pressures you have shown on this map and not try to include drillstem tests,

bottom-hole pressures and other sorts of information?

A We really thought that these measurements represented a more accurate picture of the pressure in the reservoir.

Q All right now, the green figures then, represent pressures taken during the month of August 1966?

A That's right.

Q Will you please tell us about those pressures and the procedures, or how they were taken?

A Where there is some there in green? The New Mexico Oil and Gas Engineering Committee was requested by the operators to run a field-wide bottom-hole pressure survey during the month of August. There are thirty-nine green pressures shown on the map that were taken in August. Of these, thirty-eight came from the Engineering Committee's survey. There was one of those green pressures that was available from C-122 data.

Q All right, sir, now in the report of this survey there is one pressure included that you show in red on this map, isn't that right?

A Yes, sir, there was one pressure reported by the Engineering Committee in their summary report of the pressure survey that was taken in June. It is shown in red color to put it in the right time period.

Q All right, which well is that on, please?

A That's the Union Oil Company's Union Federal 28 in Section 28, Township 21, Range 23.

Q All right now, have you computed just the arithmatic average pressure contained during this survey?

A Yes, sir, disregarding the two pressures that were included in that survey that were substantially lower than the rest, and averaging the remaining thirty-seven pressures, the average pressure, the arithmatic average pressure was 2890 pounds per square inch.

MR. NUTTER: Which two were taken?

THE WITNESS: This was 2347 which is on the Infield, by the Infield Federal Well of Section 18, of Township 21, 23. There was 2648 from the Ralph Lowe Indian Basin C Well No. 3 in Section 25, Township 21, Range 23.

MR. NUTTER: Let's do that again.

THE WITNESS: Section 25, Township 21, Range 23.

MR. NUTTER: That's 2648?

THE WITNESS: Yes.

MR. NUTTER: How about that 1659?

THE WITNESS: That was from C-122 data, that was not included in the Engineering Committee Reports so this was not the average I was speaking of.

Q (By Mr. Couch) There are three green figures shown

here that were not included in the average, is that right?

A Yes, two that were substantially lower than the rest in the Committee's report and then this one, that was reported from C-122.

Q 1659 of the J. C. Williamson Standard Gas Comp?

A Yes, 1659.

Q 1659?

A Yes.

MR. COUCH: I notice here on my map, we corrected nearly all of those, I think, but if any of you all have 1655, it should be 1659.

Q All right now, you have also, on this map, some black arrows, seven of them as I count. Will you tell what those indicate?

A Those black arrows point to wells which we have colored with different colors for each well, and these wells are shown on our next Exhibit, Exhibit 6.

Q Mr. Scott, while we are passing out this Exhibit, why did you select those seven wells, to call your attention, why are they important?

A These wells, these seven wells are the only wells for which we had bottom-hole pressure run, both during the period of substantial production, March to August 1st, and during the survey period in August of 1966. These are only

seven wells.

Q Where you had pressure in both the red and the green period?

A That's right, in both the red and the green period.

Q All right now, will you then turn to Exhibit 6 and tell us what that shows with respect to these seven wells?

A Exhibit 6 has on it, for each of the seven wells, every bottom hole pressure point that we had available for each of those wells.

Q You are again speaking from the source that you earlier described in more detail?

A Yes, same source, each of these pressures are listed on this map also in its proper color.

Q All right, sir, there are some colored bars down here at the bottom of Exhibit 6 in orange, red and green, what do those represent?

A Those colored bars relate back to the same time periods that we pointed out before on Exhibit 5, the orange representing the time period up to March 1st, '66, the red indicating the time period from March 1st to August 1st, and the green indicating August, 1966.

Q All right, that is before, during and after substantial production?

A Before, during and after.

Q The color on the bars there, or on the lines connecting the pressure points on Exhibit 6, coincide with the colors of the well spots of those wells shown on Exhibit 5?

A Yes, they do, and each well is listed in the legend on the lower left-hand side of Exhibit 6 with the well name and location next to it.

Q All right now, Mr. Scott, you testified earlier to your data sheet showing a conservative, approximate bottom-hole pressure of 2917 P.S.I.G., is that right?

A That's right.

Q And you mentioned some other wells that had higher pressures, is that right?

A That's right.

Q As far as the original reservoir pressures are concerned?

A The initial pressures may be applied to the well.

Q All right now, Mr. Scott, will you take a pencil, and others that have a copy of this Exhibit, if you will put over here on the left top side of the Exhibit 6, the figure 2940, about where that would fall, and this is a rather wide scale, isn't it, Mr. Scott?

A Yes, this is, as you notice there is a hundred pounds between the two lines in the center there.

Q 2940 might even be a little bit over the top of that scale?

A No, 2940 will be approximately a half inch below.

Q All right, I have got mine marked. Now, let's put 2917 about where it would be.

A 2917 will fall above any of the points on that exhibit, it would be somewhat over, approximately an inch or so above the bottom of 2931.

Q All right, now referring to that 2970, did you lean pretty heaving on the data of the Marathon well?

A Yes, I did. In arriving at the estimated original reservoir pressure this was the data for which I had the best field. I knew more about how the data was taken, so I estimated the weight of Marathon's data a little more so than I would have such data as C-122 furnished from other operators.

Q You judged the factor on the conservative side?

A Yes, sir, I did.

Q All right. I notice three top colors there, the blue, tan and purple showing the pressure and connected pressure points of the wells. Each of those three have higher pressures on the first pressure shown on them than the pressures of the other colors in, along about that same period of time, during the red period. Do you have the pressures on those three wells starting from the blue one?

A Yes, the blue one, the first pressure there, is 2907. This is during the red period of time.

Q All right, I'll put that on my map, and any of the rest can follow.

A The brown one is 2887.

Q The purple one?

A The purple one is 2878.

Q All right, Mr. Scott, now your pressure point becomes level at an early point in time for all of those three wells. Tell us why.

A This was the first pressure measurement made on those wells. These wells were either completed at this time or one of them was not connected prior to the time. It had been completed a couple of months early. This is the blue one. It had been completed March the 1st. The pressure measurement was in May, I believe, the scale shows.

Q All right, then would you consider that those top three there, the blue, tan and purple are initial pressures on the three wells, that you referred to?

A Yes, sir, I would.

Q All right now, on the other four wells, those wells have been completed and on production for some time, have they not?

A That's right, each of them had been completed on

production prior to the time the pressure was taken during the red period.

Q All right now, what is the significant point to you about the way these seven wells behaved in between the time their pressures were taken during the red period of production and then during the August 1966 survey?

A The real significant thing to me is that these are the only wells upon which we had pressure during both the red and green time period and all of them reacted exactly the same, all of them showed increased pressures in August.

Q Some showed more than others?

A Some showed more than others, but they all increased; there were no exceptions.

Q Is it at all significant to you that the initial pressure on the blue, tan and purple were substantially below either of the bottom-hole pressure figures, original bottom-hole pressure figures you have mentioned?

A Yes, sir, it is. I would point out one thing, this August time period, the wells in the field for the purpose of surveying, were shut-in in groups so that when we had -- had pressure measurements on them, there were one, two, three, four wells around it shut-in on the same day.

Q There is no specific or exact pattern to this is there?

A No, sir, there is no all encompassing pattern, they're not all exactly --

Q But some wells around each of these key wells, as we call them, were actually shut in, either for taking pressure or just getting ready to take pressures?

A That's right?

CROSS EXAMINATION

BY MR. NUTTER:

Q Now, Mr. Scott, let me interrupt here. You have got seven wells that had pressures in the red period and those are the only seven pressures that you had during that red period in this field?

A No, sir, we had two other pressures during that period, but for the other two wells, we did not have pressures for the August period.

Q So, these are the only seven wells that you had pressures during the red period and green period?

A Yes, sir.

Q Now, some of these initial pressures were taken upon completion, prior to production, is that correct?

A Yes, sir, three of them are.

Q And they were taken, I presume, by the individual operators as they completed their wells?

A Yes.

Q Now all of these pressures from this green period were taken by the Engineering Committee?

A Yes.

Q You had a couple of pressures that you threw out, and one because it wasn't taken by the Engineering Committee, but on these seven wells, these were all taken by the Engineering Committee?

A That's right.

Q Now, I'll ask you the obvious question; why are the new pressures higher than the old pressures, than the original pressures?

A You mean why is the August pressure higher?

Q Right.

A There are two things here, one, of course, is related to the fact there were wells shut in around these key wells, if you want to call them that, during August. The other is that in analyzing the production for the month of August for each of these seven wells and looking at it not just as one well, but as a group of wells, the block of wells around that.

MR. COUCH: You are talking about, for example, a nine square section area including all observation wells?

THE WITNESS: There was significantly lower production during August for each of those than there was during

July.

MR. NUTTER: I presume you were going to get to this, but I couldn't wait.

MR. COUCH: We are glad we encouraged this interest, Mr. Nutter.

MR. NUTTER: You are going to show drainage by this effective build-up, I presume?

MR. COUCH: Well, sir, let's just go ahead and let me see what we can show.

REDIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, was that presented as an interference test, this data that you are presenting here?

A No, sir, it was not, we took all the pressure information that is plotted on the map, Exhibit 5, and started analyzing this, and this theory came out. These were not key wells picked for that. These were just ones that fell out in our analysis of it.

Q In other words, what you have attempted to do here is assemble all available pertinent data and bring it to the Commission, not for the purpose of trying to manufacture evidence for the case or anything of that nature, is that right?

A That's right.

Q So this we can't say is a perfect demonstration of an interference test, but it is actual field conditions and field testing procedures that were followed?

A You could not call this ideal interference test conditions.

Q Mr. Scott, two of those wells on which initial pressures were taken were Marathon Oil Company wells, weren't they, in the red period?

A In the red period.

Q Do you know whether Marathon had people present during the taking of the survey, bottom-hole pressure survey in August, '66?

A By Committee survey?

Q Essentially, yes.

A In this survey, the operator did furnish help for the Engineering Committee to run it, yes.

Q Was Marathon present during most of these occasions?

A Yes, sir.

Q Go ahead.

A Yes, sir, there was a Marathon representative each time a pressure was taken around a Marathon well.

Q Do you know whose equipment was used in the taking of those pressures in the survey?

A During this survey, the Engineering Committee lost their bomb in the fifth well that they bombed. They did ultimately fish it out, but we had to run, that is, Marathon had to run our instrument into the hole behind them on two of these first five wells and we had to check pressures between their bombs and our bombs. When they lost their bomb, they then took our bomb and completed the survey with it.

Q All right, Mr. Scott, I will ask you now, then, to look at what has been marked Marathon's Exhibit No. 7. Please identify that, and tell us briefly what it reflects.

A Marathon's Exhibit 7 is a sheet showing well cost or economics for the Indian Basin Upper Penn Pool. Here is what we have done; and the first line shows the well cost of a typical Upper Penn single completion. We took this from actual dollar values that Marathon has spent on the wells that they have participated in the drilling of. This typical well cost $155,000.00. I would say that we have not drilled very many for that.

Q As a matter of fact, this typical log expansion you now have is what might cause you to drill another?

A Yes, this cost you could expect today, with the expense you have behind you and I think it is a good typical number of what it would cost Marathon to drill one single well.

Q Do you think it's high or conservative?

A I think it is a good figure.

Q Go on to the next line.

A In relation to using this $155,000.00 we have shown here what the approximate cost of fifty-three successful Upper Penn completions would have been, at $155,000.00 per well. There are fifty-three completions now in the Pool; if these fifty-three completions had cost $155,000.00 each, that would be an expenditure of $8,215,000.00. As a matter of fact, there has been substantially more money than that spent to develop these fifty-three completions.

Q All right, and then what is the last figure you have got on there?

A The last line there shows the approximate cost of fifty-two additional wells to drill to 320 acre density within present pool limits at this same $155,000.00 per well. This would require an expenditure of $8,060,000.00.

Q Mr. Scott, do you have any opinion on whether any additional volumes of gas that might be produced by the fifty-two additional wells would come anywhere near this $8,060,000.00 figure?

A It is my opinion that fifty-two additional wells to drill to three hundred and t[illegible]y acre density would not yield a substantial, enough volume of additional gas and therefore to have this pool on three hundred and twenty acre spacing would

require drilling fifty-two unnecessary wells and result in economic waste.

Q All right, now, Mr. Scott, you gave us a cumulative production figure awhile ago on your Exhibit No. 4.

A Yes, sir.

Q I wish you would give us that again, please sir.

A This was 38,912,000 cubic feet.

Q That was to January 1, '67, wasn't it?

A That's right.

Q Just briefly referring to your Exhibit 6, again, would you give us some approximation of what the cumulative production was up to the time of the August survey, the green period that was August, '66, what the cumulative production you gave us was to January, '67?

A Yes, sir, I don't have the precise figure on it, it is approximately 19,000,000,000 cubic feet.

Q Now, Mr. Scott, considering all of this information that you have here that is available to you, give us your opinion as to whether a well in the Indian Basin Upper Penn will sufficiently and economically drain in excess of six hundred and forty acres.

A It is my opinion that the Indian Basin Upper Penn Pool will sufficiently and exonomically drain in excess of six hundred and forty acres.

Q Now, you have already testified that drilling up to a density of three hundred twenty would constitute the drilling of an unnecessary well?

A Yes, sir.

Q So can you state, in relation to the establishment of six hundred and forty acres as permanent spacing for this pool, whether in your opinion that would tend to prevent the drilling of an unnecessary well?

A It is my opinion that the establishment of permanent six hundred forty acre spacing for the Indian Basin Upper Penn Pool will prevent the drilling of unnecessary wells and prevent economic waste.

Q What about exposure to physical waste, Mr. Scott?

A Well, the drilling of a well in the -- there is circulation problems in the Upper Penn;there have, in fact, been two blowouts so the drilling of an unnecessary well to me leaves open the possibility for physical waste.

Q It would increase that exposure?

A Definitely increase that exposure.

Q All right, now, Mr. Scott, let's refer specifically to the Indian Basin-Morrow Gas Pool and look back at Exhibit 2, the Pool Limits map.

A All right, on Exhibit 2 this refers to the Indian Basin-Morrow; now, noticing again that the horizontal pool

limits are outlined in orange.

Q These are the pool limits that Mr. Nutter mentioned that were presently fixed by the Commission?

A That's right.

Q Noting again that the orange half circles have been used to indicate the wells that are Morrow duals. Now, are all Morrow completions duals, Mr. Scott?

A All of the Morrow completions are duals within the Upper Penn. Noting again that the orange half circles show some fourteen dry holes that have been drilled within the Upper Penn Pool Limits, dry as far as the Morrow is concerned. I would point out here that of the eight successful completions in the Morrow only seven are now producing. One of those wells produced only fuel and its bottom hole pressure declined to less than 500 pounds where it will not now go under the basin part.

Q Is that one of seven or one of eight?

A One of eight.

MR. NUTTER: Which one is that?

THE WITNESS: It is Marathon's Indian Basin No. 6, Sections 22, 21, 23.

MR. NUTTER: So it is deleted in the Morrow, so to speak?

THE WITNESS: Until at least such time as it is

economically feasible for the present method of operation, yes. This leaves us with seven.

Q (By Mr. Couch) It has not been plugged and abandoned in the Morrow?

A No, sir.

Q All right.

A I would like to point out here, referring back to Exhibit 3 that on the record line there, we show that there are two wells penetrating the Morrow as of this date, within the Upper Penn Pool Limits. Only seven of those wells are producing a success ration of one to three for development wells in the Pennsylvanian. A poor success ratio.

Q All right, Mr. Scott, tell us a little more about the reservoir pressure performance and other data regarding the Morrow Pool.

A Exhibit 6 which we have here is a data sheet for the Indian Basin-Morrow Gas Pool and we can go down it again, as we did the one on the Upper Penn, pointing out that it does show the number of wells, the acreage and so on. It doesn't point to other reservoir data.

I have put on this Exhibit the original reservoir pressure data of -5353 and estimated it to be 3680. Right below there, I pointed out that the measured range of initial pressure is from 3208 P.S.I.G., to 3750 P.S.I.G., there again

using my judgment to make an arithmetic estimate of what the average, or average initial bottom hole pressure is, thirty six eighty.

MR. NUTTER: Did you use two porosity cut-offs on this pool also?

THE WITNESS: Yes, sir.

Q (By Mr. Couch) Mr. Scott, would you say that the reservoir pressure performance is erratic?

A Yes, sir, the pressure performance has been quite erratic for the Morrow.

Q What about the pay in general?

A In drilling of the Morrow, I believe everybody that has drilled it has found the pay, itself, to be quite erratic.

Q In your judgment, in order to have any possible economic way to complete in the Morrow, how would it have to be done?

A In my opinion, the only reasonable and economic way to develop Morrow production is through drilling in the Indian Basin Upper Penn Well.

Q Does the pump limit prevent development of these pools?

A That's right.

Q All right, will you then look at Exhibit 9?

A All right. Our Exhibit 9 is again, a well cost or economic tabulation. Going down this Exhibit and using again the actual cost figures that were available to me from the Marathon drilling cost as the wells from which Marathon participated in, it is my estimate that a typical Morrow single completion, with no attempt to complete in the Upper Penn, would cost some $200,000.00; well cost of a typical Morrow single completion.

Q If there was an unsuccessful attempt to complete the Upper Penn, would $210,000.00 be feasible?

A The well cost of a typical Morrow Upper Penn dual I estimate at $257,000.00 and I would like to qualify that number. We have not drilled one, a dual completion for that low a figure, so really, what I put down for this figure, the $257,000.00 for a dual, this is not based on our actual money experience, this is based on the fact that we have no drilling experience in the area and we think we could drill one for this amount. Now the last figure there shows that, the last dollar figure shows the additional cost to dual in the Morrow with an Upper Penn well, that is above the cost of the Upper Penn single, that is $102,000.00 extra cost, cost of an Upper Penn single. The last line there, I have estimated the chance for success based on the experience in this Pool Area at 33%.

Q Again, you are talking about development wells?

A Again, we are talking about development wells.

Q Trying to be development wells?

A That's right.

Q All right, now, have you got some estimates and they would have to be estimates, of the ultimate recovery to be expected from a Morrow completion, assuming you could make one?

A Yes, sir, assuming you could make one, and on an average basis, not taking the high nor the low, I would state that you could expect to recover from one to two billion cubic feet from a Morrow completion.

Q All right, sir, what does that mean to you in terms of whether it would be an economic venture to drill a well for Morrow production only?

A A straight up well or Morrow, a well drilled just for the Morrow production, based on this estimate of probable ultimate recovery, would not be an economic venture.

Q Well, is the dual completion commercially attractive?

A A dual completion is a poor economic venture, but it does present the only reasonable economic route to produce from the Morrow.

Q For anyone who wants to attempt it?

A That's right.

Q All right, will you then give us your conclusion with regard to permanent pool rules for the Indian Basin-Morrow Gas

Pool?

A For the Morrow, based on the manner of practical application of the economics and that is being usage of dual completions out to development of the Morrow and our knowledge, erratic knowledge of the pay, it is my opinion that the development should be the same as that for the Upper Penn.

Q That is spacing?

A The spacing should be the same as that for the Upper Penn. I would therefore recommend that -- it is my opinion that six hundred and forty acre spacing will prevent the drilling of an unnecessary well and prevent economic waste. Again I would point out that there have been two blowouts in the field and the drilling of an unnecessary well does present a problem or possibility of physical waste.

Q Mr. Scott, do you have any other direct testimony to offer at this time?

A No, sir.

MR. COUCH: That concludes the direct examination, Mr. Examiner.

MR. NUTTER: I think before we get into cross examination, we will take a ten-minute recess.

(Whereupon, a short recess was taken)

MR. NUTTER: Hearing will come to order. Does

anyone have any questions of Mr. Scott?

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Scott, up north of the Indian Basin Pool, there are a couple of Paskin Wells in Sections 4 and 5 of Township 24 South 24 East, I believe those are Morrow wells, are they not?

A Yes, sir, my understanding is that those wells are in the North Indian Hills-Morrow Gas Pool.

Q Now, this Union well of Section 18 of that Township, which is shown "dry hole", did it go to the Morrow zone?

A Yes, sir, the total depth shown on the map is 9,755.

Q And at the present time, Marathon's No. 6 in Section 17, is not projected into the Morrow?

A No, sir, not at the present time.

Q So as far as 17, we know, these two wells in Section 4 and 5 are in different pools and from the wells we have got data on, are not projected today, they will remain in a different pool?

A Yes, sir.

Q It just happens, by the way, that surveys were made of those wells, as 900 acre wells, rather than 640; I just wondered if there would be any apparent drainage by any other

wells, by those large acreages.

A I wouldn't anticipate it.

Q Now, Mr. Scott, would you elaborate a little further why you have used 2,917 as the original pressure for the Upper Penn?

A We we did take the original measured pressure, the pressure measurements that were made by Marathon were in this time period prior to substantial production. These pressure measurements were on the low side where other pressure measurements were on the high, and since I knew more about how the Marathon pressures were run, I, in my own mind, put more weight on them, this is why I came up with as low an average as that; and this is why I state that it was what I would consider a minimum.

Q Now, these higher pressures, meaning 2952 and 2947, I believe; were those drillstem tests shut-in pressures or were they measured pressures?

A The 2940, that I mentioned earlier, was for the Sunbright Federal Well and this was on a C-122, so here I don't have -- this is the purpose for which it was taken. I believe where I got -- yes, where I got that was from AU, that is a report to U.S.G.S. Form 9-330.

MR. COUCH: Not C-122?

THE WITNESS: That is not where I got it, but the

Sun gentleman told me this was available from data they had taken from a C-122. I would not -- the question of the usage of a higher original pressure than 2917, it is just in my arriving at a number I had to, in my mind, irradiate it.

Q (By Mr. Nutter) Now, you gave a statement of estimated recovery between one and two billion cubic feet. I didn't hear any figure relating to the ultimate recovery from the Upper Pennsylvanian. We have got all the data we need here to calculate volumetric reserves, except possibly the net feet of pay. Do you have any idea as to reserves here for the average well or for the pool as a whole?

MR. COUCH: Mr. Nutter, excuse me, please sir. I am not attempting to preclude the Commission from any information we have that would be of interest or help to you, but it was our contention in preparing for this hearing that we would be talking in terms of spacing rather than in terms of any allocation or production of the wells, and so no effort was made to attempt to compute these things. It would be necessary in any allocation.

MR. NUTTER: Mr. Couch, the Commission has already considered the economic development of a pool. We have got economics over well costs in here as a matter of record. What it would cost to continue to develop the pool on 640 acre spacing was compared with development, of 320 acre spacing

reserves and was entered into the order in the original hearing in this case when there were three wells drilled. I believe, well, a maximum of six, apparently, within the map requirement. We had a reserve estimate at that time which was four years ago, and I think subsequent development here has shown a lot of things and might show how, well, these reserves that were entered into the record four years ago, it might show how accurate they were.

MR. COUCH: We do know of a reserve figure that Principal Pipeline Purchaser has made, a reserve for the field and you can allocate that, or use that figure if you like.

THE WITNESS: If you like, from the information that is available to me, that natural gas has worked out, I believe that they estimated for the Upper Penn, dedicated to them, approximately 1.3 trillion. Now, if this is extrapolated for that dedicated to the Southern Union, I believe you would come up with the actual proper range of 1.4 to 1.5 trillion.

Q 1.3, that is dedicated wells?

A Yes, sir.

Q Now do they have a comparable figure on the Morrow wells?

A Yes, the number that they presented to us for the Morrow, dedicated to them is, may I get that out, I believe I

have that letter with me, 24.8 --

MR. COUCH: Just give it as it's shown.

THE WITNESS: All right, 24,868 M.M.C.F., and this is quoted from the letter of Natural Gas Pipeline Company. This is dedicated natural gas.

Q 24,868 M.M.C.F.?

A Yes.

Q Now, these wells are dedicated to Natural Gas Pipeline?

A Yes.

Q Do they have all connections in the Morrow?

A No, they don't.

Q This extrapolated figure then too includes the Southern Union dedication?

A Yes, sir, it comes to 28,971 M.M.C.F. on their figures.

Q Now, these figures that you have given Mr. Scott, are they up-to-date, I mean we have got fifty-three wells producing from the Indian Basin Upper Penn at this time, or have they done this on the field basis regardless of whether a well had been drilled or not?

A No, sir, the tabulation they mailed to us is on a well basis.

Q Does it have fifty-three wells for the Upper Penn?

A Yes. Yes, sir.

Q And then the figure of 24,868 or 28,971, is it based on the seven or eight Morrow wells?

A Their tabulation shows nine. I would have to spend a little time with it to see why. Oh, it includes,their tabulation includes one well that was not completed in the Morrow and includes 1,106 M.M.C.F.; that is, well - the figure that they gave for that well was 1,106 M.M.C.F., so this well was not completed in the Morrow. If that number were subtracted off, then this would give a number representing their estimate of reserves for the completed wells and that does include Natural Gas and Southern Union.

Q Now, could you give me the price that is paid for the gas and condensate in this area by the two purchasers?

A Sixteen and a half M.C.F., $2.76 per barrel. These are the latest numbers available to me.

Q Now, that is Natural Gas Pipeline, do you know what Southern Union pays for their gas?

A No, sir, I don't.

MR. COUCH: For the record, Mr. Nutter, I don't believe Natural Gas Pipeline is the purchaser of condensate, but that is the price, I know for gas. I don't know who the condensate purchaser is.

THE WITNESS: Permian.

MR. COUCH: But again that is condensate sold from the plant as distinguished from condensate that may be sold from any --

Q (By Mr. Nutter) I that condensate less than 18¢ trucking fee?

MR. ENFIELD: 17,725 for the net, less taxes is what we get for condensate.

MR. NUTTER: Let the record show that was Robert Enfield responding to that question.

Q (By Mr. Nutter) Now, Mr. Scott, on those green pressures that we were talking about a while ago, we had two or three that were low. To what do you attribute those low pressures, and what was the length of shut-in time to obtain the other pressures that the Engineering Committee ran?

A During this green period?

Q Yes, sir, the green period.

A They were all at least twenty-four hours. There were two pressure reports of the Engineering Committee that were run by the operators, but they again reported at least twenty-four hours shut-in.

Q Were some shut-in more than twenty-four hours?

A Yes, some were shut-in at least --

Q Were they shut in until pressures were stabilized? What is the difference in a twenty-four hour and thirty hour

shut-in?

A My estimate would be that the wells were probably shut-in at a certain time of the day and by the time they got around to bombing them, it was some hours later. There was one pressure in that group, I think it was reported by the operator though, yes, sir, one pressure in that group which was run by the operator, was a one month shut-in.

Q Which one was that?

A This was the Redferns Winston Gas Comp, Section 39, 21, 34.

Q And had a pressure of 2,880?

A 2,880.

Q That was a thirty day shut-in?

A Redfern Development Corporation.

Q Well, now, Mr. Scott, does there appear to be variation in the permeability, as you go from one area to the other , that would cause a difference in the way these wells reacted to shut-in, that is whether pressure would build up or not?

A Well, of course, with only cores of seven wells available to me, it would be very difficult for me to make an estimate on a field-wide basis as to whether this occurs or not; from the core samples that we had, some were very long cores with lots of samples, some were short ones, and to say that

they were truly representative in total, and to try to get something like this from it, I would hesitate to do that at this time.

Q Well, we do have a difference in the pressures measured, particularly out here on Section 19 and these pressures are 1,659 pounds, what would contribute to a real low pressure like this?

A Well, sir, if you will look at the Odessa-Natural Winston Standard Gas Comp No. 1, the entire pressure history here has been quite erratic. I would just say that on this well behaves erratically.

Q How about the well's production, is it a good producer?

A Would you like to know how much it is?

A Well, not especially, is it a good producer or a poor producer?

A My understanding is, it is very poor, although I can give you the cumulative on it through 1967 -- through '66, I mean. It has produced cumulative gas of 1,103,198, according to my records, that is M.C.F., 1,103,198 M.C.F.

Q Through '66?

A Through '66.

MR. NUTTER: Does anyone have any questions of Mr. Scott?

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Scott, these porosities from your cores and your logs are relatively low, aren't they, at least they are not very high?

A I think that they are not exceptionally low, considering that this was a dolomite reservoir basically.

Q But the permeability then, is quite good?

A I was pleased to find in my analysis of the permeability that it was this good from the core samples available to us, yes.

Q Would you think that the good production from the wells in this pool results from the relatively good permeability in the pool?

A Do you mean, well by well there, can you rephrase it a little?

Q Yes. These wells are quite good in general, and would you say that the reason they are good is because of the relatively high permeability present in the Pool?

A Yes. I would add this, the dolomite is fracked in part, it's vugular in part, it is possible that this permeability average I have would be even higher if you could evaluate the fracture permeability and some of the permeability due to the vugular nature of it.

Q Would you consider this permeability to be relatively constant across the main portion of the field?

A I think that the bottom hole pressure behavior that bottom hole pressure data that this is true.

MR. STAMETS: That's all the questions I have.

MR. NUTTER: Are there further questions of Mr. Scott?

MR. COUCH: I have one or two.

REDIRECT EXAMINATION

BY MR. COUCH:

Q Mr. Scott, what is your opinion regarding the capacity of the existing wells in these two pools to supply the market demand for the foreseeable future?

A The capacity of these wells is well in excess of what is necessary to supply the immediately foreseeable market demand.

Q All right, and the overall spread in the pressures taken during the survey is approximately how many pounds, not counting the two low pressures and throwing them out?

A The pressure spread between those that are in a group, is sixty pounds.

Q That is, high and lowest, if you throw out one that you think is just an odd-ball?

A That's right.

Q Over a total of how many acres, did you say?

A 34,766.6, I would have to look it up again.

MR. NUTTER: Mr. Scott, in saying that the capacity of these wells is sufficient to satisfy the market demand, are you considering the weather in Chicago this last week?

THE WITNESS: Yes, sir.

MR. NUTTER: Are there any further questions. If not the witness may be excused.

MR. COUCH: I would like to offer -- I better ask Mr. Scott.

Q (By Mr. Couch) Were Exhibits 1 through 9 prepared by you or under your supervision, Mr. Scott?

A Yes, sir.

MR. COUCH: I offer in evidence, Marathon's Exhibits 1 through 9.

MR. NUTTER: Marathon's Exhibits 1 through 9 will be admitted in evidence.

(Whereupon Marathon's Exhibits 1 through 9 admitted in evidence)

MR. NUTTER: Do you have anything further, Mr. Couch?

MR. COUCH: No, sir, other than reservation of the right to make a final closing statement.

(Witness excused)

MR. NUTTER: Does anyone have anything?

MR. KELLAHIN: I have one witness. He will be

quite brief, that might be helpful. Jason Kellahin appearing for Standard Oil Company of Texas; I have one witness I would like to have sworn.

(Witness sworn)

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Paul Hull.

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

A Standard Oil Company of Texas, Supervising Proration Engineer.

Q Have you testified before the Oil Conservation Commission of New Mexico and made your qualifications a matter of record?

A Yes, sir, I have.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

(Whereupon, Standard's Exhibits 1 and 2 were marked for identification)

Q (By Mr. Kellahin) Mr. Hull, have you made a study

of the economics of the producing gas from the Indian Basin Upper Pennsylvania Pool?

A Yes, sir.

Q Did you make the same study as to the Morrow?

A No, sir.

Q And for what reason?

A We have no wells in the Morrow.

Q Now, in connection with your study of the Indian Basin Upper Pennsylvanian Pool, what did you do?

A Set up a reservoir group as a computer program, as part of the computer library to calculate a number of factors concerning a gas reservoir, one of which, being cumulative production for spacing and this provided a number of other perimeters at the same time, the period required to produce the reservoir, and this is a rather routine calculation that we make of a number of fields.

Q Now, is this calculation contained on what has been marked Standard's Exhibits No. 1 and 2?

A It is.

Q Would you state briefly what was done on Exhibits 1 and 2?

A The only difference in these Exhibits is that 1 is calculated for one well on 640 and the other for two on 640 acre spacing and 320 acre spacing.

Q Now, you had to have some basic data in order to perform this calculation, did you not?

A That's right.

Q What was your source of data for the calculation?

A We obtained a number of the reservoir perimeters from Marathon because they had been making a considerable more study, detailed study of the field than we had. Specific gravity of gas is a factor, initial bottom hole pressure and the reservoir, temperature from Marathon, some of the other factors, net pay, we picked from one of our logs.

Other data that was plugged in here, well contract time, the pressure basis and the point when it would be necessary to install a compressor in order to deliver the contract quantity of gas; and working interest, well operating costs, compressor maintenance cost, these things were of value.

Q Now, you have one heading there "contract time, twenty years", that is the term of the contract you have on the gas production, is that correct?

A That's right.

Q You used somewhat of a higher initial pressure than Marathon, did you not?

A No, sir, this is the same. Marathon's gauge was figured the same, one is gauge and the other is absolute.

Q I see; so for the purpose of this calculation, they are the same pressures, basically, is that correct? I mean, same initial pressures?

A I believe that's right.

Q Now, you picked 142 as your net pay thickness?

A Yes.

Q How did you arrive at this figure?

A This was from one of our logs that had an average potential and we ran this program rather hurriedly and didn't feel we had time to make a detailed analysis of this particular perimeter, and we felt this would be close enough for the purpose of what we are trying to demonstrate here.

Q Now, with that background, would you discuss what the exhibit shows, the exhibits, discussing both of them.

A All right, there is a number of columns there with the heading of time and production rate, flowing bottom hole pressure, cumulative production and center recovery. The production rate, of course, is dictated by the contract itself. One-twentieth of the reserve being produced each year. The reserve in this particular case being calculated from the data we put into the program and the reserves differ slightly from the reserves that are being carried by Natural Gas Pipeline Corporation of America. This particular discrepancy, once again, would not make a significant difference in the ratio

of the two results. The calculation here of the original gas in place, was 26.6 million M.C.F. and I believe this is gas in place with an 89% recovery and Natural Gas carrying something like 26.3 recoverable, so there is approximately a 10% discrepancy.

Q Would that affect your basic calculation?

A It would not affect it, since it would apply to both cases, it would not affect the ratio to no more significant figures than we are considering.

Now, as you go down this, you will note that after sometime during the twelfth year, it is necessary to install a compressor in either case, in order to deliver the D.C.G. now, to point the production from the 640 acre tract is the same. Whether there is one well or two wells, there is absolutely no difference in the income.

There is no increase in the income to be gained by drilling the second well. At this point; if we have one well, the compressor must be installed in 12.64 years, and for two wells it doesn't have to be installed until 12.71 so we gain a few days there, about seven days, but that is twelve years down the road, and present worth on that installation wouldn't be significant. From that point on until sometime during the nineteenth year with the compressor, we would be able to deliver the D.C.G., in either instance.

Decline would begin of one well somewhere after 19.48 years and production would continue economically at the end of 21.41 years. For two wells, this decline would begin after 19.74 and would continue until twenty and a half years, so there is about .9 of a year difference there, so that the entire difference in rate of income would occur after this 19.48 years when the one well would begin to decline. The cumulative production, however, in these two instances would differ by less than 1,000,000 cubic feet for one well, the cumulative being 23,000,879.98 M.C.F. -- excuse me, a million cubic feet, M.M.C.F., and for the two wells, it would be 23,000,880.1 M.M.C.F., so we are talking about a difference in recovery here of less than a million cubic feet, a little over a hundred dollars difference in income.

Q Would it be economic then, to drill two wells to recover that much additional gas?

A Even, assume we would be drilling a well for $155,000.00, Marathon's estimate, obviously would not be economic.

Q Now, their conclusion is based on the assumption that one well will drain at least 640 acres?

A Yes, sir, it is.

Q Now, you heard Mr. Scott's testimony, including his information on pressure tests, permeability of formation

and other factors; taking those factors into consideration in your opinion, will one well drain in excess of 640 acres?

A Yes, sir.

Q Were Exhibits 1 and 2 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: We will offer Exhibits 1 and 2.

MR. NUTTER: Standard's Exhibits 1 and 2 will be admitted in evidence.

(Whereupon Standards' Exhibits 1 and 2 were admitted in evidence)

MR. NUTTER: Does anyone have any questions of Mr. Hull? He may be excused.

(Witness excused)

MR. KELLAHIN: That's all we have, Mr. Nutter.

MR. NUTTER: Does anyone have anything.

MR. FORD: I have a statement.

MR. NUTTER: We will take statements.

MR. FORD: George Ford from Pan American Petroleum Corporation. We concur wholeheartedly with the recommendation of Marathon Oil Company for permanent field rules including 640 acre units for these two pools.

We are alarmed at the Exhibit 7 of Marathon, this shows over eight million dollars for fifty-two additional

wells. That would be unnecessary if we have to develop this reservoir to 320 acre spacing, Pan American operates eight completions in the Indian Basin Upper Penn Pool. Our completions would represent about a million and a quarter dollars of this total amount.

We believe that the other evidence and testimony proves conclusively, that a well would drain over 640 acres in this pool, especially Exhibit 6. This Exhibit shows that at least three wells that were completed after a substantial production started, had a pressure draw-down below the original pressure in the vicinity of their well bores, without any production from those well bores. Now this can be due only to pressure communication over wide areas in the reservoir, that is development on 640 acres, so we respectfully urge the Commission to adopt the present temporary rules and permanent rules for the Indian Basin Upper Penn and Morrow Gas Pools.

Thank you, sir.

MR. KELLAHIN: Mr. Nutter, Standard Oil Company as the witness has stated, has no Morrow wells; however, they are the operator of wells in the Upper Pennsylvanian Pool, and are in support of Marathon Oil Company's presentation for 64-acre spacing in that pool. We feel that it has clearly been tabulated that one well will drain in excess of 640 acres and that the drilling of wells on 320 acres would not only be costly

and unnecessary, but would result in the production of very, very little additional gas, an amount that is almost insignificant and the cost of drilling equipment and connecting up wells would be an economic waste. For that reason, we recommend very strongly the adoption of 640 acre drilling and proration unit for the Indian Basin Upper Pennsylvanian Pool.

Now, as to the Morrow, admittedly, Standard has no wells in that pool. However, we do feel that the testimony shows rather clearly that the production from the Morrow is erratic. That experience has shown that the wells in this particular pool can only be drilled in conjunction with other wells, and in the interest of orderly development and proper development of the pool and, as a matter of fact, in the interest of obtaining any development in the Indian Basin Morrow Pool, the well location drilling and proration unit should be the same for the other horizons in order that the operator might economically dually complete wells in the Morrow.

MR. NUTTER: Thank you. Anyone else?

MR. JORDAN: I have a statement. J. B. Jordan, Union Oil Company of California in Roswell, and I would like to state that Union supports Marathon's application for 640-acre spacing.

MR. NUTTER: Thank you, Mr. Jordan.

MR. ENFIELD: Robert Enfield, and I would like to say

I support Marathon's presentation for both the Upper Penn and the Lower Penn Morrow.

MR. GEDDIE: Ivan D. Geddie, representative of Kerr-McGee Corporation. Kerr-McGee Corporation operates one well in the Indian Basin field and owns an interest in ten others. From our independent study of the Upper Pennsylvanian and Morrow Reservoirs of the Indian Basin field and from evidence which has been presented here at this hearing, our company has come to the conclusion that 640 acre spacing units are proper for these reservoirs. It is therefore recommended that the Conservation Commission establish 640 acre units for gas wells completed in the Indian Basin Upper Penn and Morrow Pools.

MR. NUTTER: Thank you.

MR. GOODMAN: Fred Goodman, of Ralph Lowe Estates and Lowe Drilling Company. We wholeheartedly concur in Marathon's presentation and recommend the adoption of permanent 640 acre spacing.

MR. NUTTER: Mr. Sturdivant?

MR. STURDIVANT: W. C. Sturdivant, for Sun Oil Company. We operate one well and have an interest in eight wells in these pools. We concur with the statements made and recommend adoption of the permanent 640 acre spacing.

MR. NUTTER: Thank you. Any other statements to

the hearing? Mr. Hatch, do you have any correspondence?

MR. HATCH: I have correspondence from Sinclair Oil and Gas, Texaco, Incorporated, Hannigan Oil Company, Texas Pacific, Redfern, Shell, letters from Tidewater and Odessa Natural Gas Company, all in support of the application.

MR. NUTTER: 640 acre spacing is popular in this pool.

MR. COUCH: As a matter of fact, I think it's unanimous.

MR. NUTTER: Is there anything further in Cases 2749 and 2750?

MR. COUCH: A letter from Mr. Curtis Inman supporting the making permanent of the present 640 acre spacing, and spacing rules in both pools. We have also received a telegram from Mr. Hannigan. Does that telegram have about ten different signatures on it?

MR. HATCH: Yes, it does.

MR. COUCH: All right, I have a telegram from Monsanto supporting the recommendations we are making here today, and I have been advised by telephone from my office in Houston that there is a letter from Phillips concurring and supporting our position. I will submit that letter, if I may, later to the Commission records.

MR. NUTTER: That will be fine.

MR. COUCH: I would like to make just one observation that in setting 640 acre spacing for these pools, when it did, in 1963, the Commission has encouraged and made possible the very rapid development and extremely significant gas reserve in the State of New Mexico. In this four years time, there has been an average of approximately one and a half wells drilled a month in this pool area at a substantial expenditure and investment by the operators, and the substantial definition of these pool limits in this four years time can, I think, certainly be attributed very gratefully to the Commission's wisdom in adopting the 640 acre spacing when it did. I would like to say also that in this wide area of thirty-four thousand, sum odd, acres, that our pressure differentials across the field there, are still, other than one or two obviously erratic performing wells, are within a reasonable range of 51 pounds from top to bottom and we strongly urge the Commission that they make permanent the spacing rules contained in the original orders entered in these cases four years ago. Thank you, sir.

MR. NUTTER: Thank you. If there is nothing further in Cases 2749 and 2750, we will take those cases under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, JERRY POTTS, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached transcript of hearing was reported by me in stenotype and that the same was reduced to typewritten transcript under my personal supervision and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

Notary Public

My Commission Expires:

7-10-62

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2744-2750 heard by me on 28 1962.

, Examiner
New Mexico Oil Conservation Commission

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

September 7, 1962

REPLY TO
P. O. BOX 4337
MIDLAND, TEXAS

Mr. Ralph Lowe
Box 832
Midland, Texas

Subject: Core Analysis
Indian Basin No. 1 Well
Wildcat
Eddy County, New Mexico
Location: Sec. 23-T21S-R23E

Dear Sir:

Pennsylvanian formation analyzed from 7610 to 7635 and 9200.0 to 9204.5 feet is interpreted to be gas productive where permeable. An economic completion will be entirely dependent upon additional productive formation being present above or below the cored intervals. A formation treatment will be necessary for satisfactory rates of flow. Summaries of average core analysis data are presented on page one of the report.

Formation analyzed from 9044 to 9050 feet is impermeable and non-productive and Devonian formation analyzed from 10,095 to 10,111 is interpreted to be water productive where permeable.

We sincerely appreciate this opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

R S Bynum Jr

R. S. Bynum, Jr.,
Division Manager

RSB:HC:dc

CL 316

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page 1 of 1 File WP-3-1945
Well Indian Basin No. 1

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Pennsylvanian 7610.0-7635.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		25.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		48.7
FEET OF CORE INCLUDED IN AVERAGES		14.4	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	48.7
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	0.6	OIL GRAVITY: °API		
	90°	0.3			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	8.6	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	4.3			
AVERAGE POROSITY: PER CENT		5.0	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		1.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL: Pennsylvanian 9200.0-9204.5

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		4.5	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		19.3
FEET OF CORE INCLUDED IN AVERAGES		4.5	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	19.3
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	2.5	OIL GRAVITY: °API		
	90°	2.2			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	11	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	9.9			
AVERAGE POROSITY: PER CENT		6.6	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		2.2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

Distribution of Final Reports

3 Copies	Mr. Ralph Lowe Box 832 Midland, Texas
6 Copies	Mr. N. E. Webernick Marathon Oil Company Box 1398 Roswell, New Mexico
5 Copies	Mr. J. W. Hodges Sinclair Oil & Gas Co. Box 1677 Roswell, New Mexico
4 Copies	Mr. D. C. Fish Kerr-McGee Oil Industries, Inc. Globe News Bldg. Amarillo, Texas

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

January 4, 1963

REPLY TO
P. O. BOX 4537
MIDLAND, TEXAS

Mr. Ralph Lowe
Box 832
Midland, Texas

Subject: Core Analysis
Indian Basin No. 1-A Well
Eddy County, New Mexico
Location: Sec. 22-T21S-R23E

Dear Sir:

Canyon formation analyzed between 7374.0 and 7660.4 feet is interpreted to be gas productive where permeable. The productive capacity is considered adequate for satisfactory production rates without formation treatment. Average core analysis values are presented on page one of this report.

From 7660.4 to 7675.6 feet, Canyon formation exhibits high total water saturations and is interpreted to be both water and gas productive.

Strawn sand analyzed from 8667 to 8678 feet is considered to be gas productive where permeable; however, due to low permeability, a completion attempt is not recommended. Average core analysis values also are presented for the interval on page one.

Permeable Morrow formation analyzed at intervals between 9132.0 and 9324.7 feet is interpreted to be gas productive with adequate productive capacity for satisfactory rates of production without formation treatment. A summary of average core analysis values is presented on page two.

Due to lower residual oil and high total water saturations, the interval from 9324.7 to 9360.0 feet is interpreted to be water productive where permeable.

We appreciate this opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

R S Bynum Jr.

R. S. Bynum, Jr.,
Division Manager

RSB:JR:dc

CL 318

CORE LABORATORIES, INC

Petroleum Reservoir Engineering

DALLAS, TEXAS

Well Indian Basin No. 1-A

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Canyon 7374.0-7660.4

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		273.9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		35.4
FEET OF CORE INCLUDED IN AVERAGES		181.4	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	35.4
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	44	OIL GRAVITY: °API		
	90°	13			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	7982	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	2358			
AVERAGE POROSITY: PER CENT		3.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		4.8	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL: Strawn 8667.0-8678.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		11.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		54.4
FEET OF CORE INCLUDED IN AVERAGES		6.2	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	54.4
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	0.2	OIL GRAVITY: °API		
	90°	0.2			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	1.2	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	1.2			
AVERAGE POROSITY: PER CENT		8.5	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		2.2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

CL 310

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Well Indian Basin No. 1-A

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Morrow 9132.0-9324.7

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		187.9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		48.5
FEET OF CORE INCLUDED IN AVERAGES		18.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	48.5
AVERAGE PERMEABILITY: MILLIDARCYS	Max. 90°	12 11	OIL GRAVITY: °API		
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max. 90°	216 198	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
AVERAGE POROSITY: PER CENT		10.8	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		3.9	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL:

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

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Memo

From
D. S. NUTTER
CHIEF ENGINEER

To

Application of Ralph Lowe to create a new pool for Morrow gas production, and for Special Pool Rules, Eddy County, New Mexico.

Applicant, in the above styled cause, seeks the creation of a new gas pool for Morrow production in Sections 22 and 23, Township 21 South, Range 23 East

VII

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool [illegible] Formation Morrow Sand County Eddy

Initial X Annual _____ Special _____ Date of Test 1/10-11/[illegible]

Company Gulf Oil Lease Indian Basin "AP" Well No. 1 (Lo[illegible]

Unit J Sec. 22 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 9385 Perf. 9118 To 9266

Tubing 2"[illegible] Wt. 4.70 I.D. 1.995 Set at 9053 Perf. _____ To _____

Gas Pay: From 9118 To 9266 L 9053 xd Mix =.608 -GL 5504 Bar.Press. [illegible]

Producing Thru: Casing _____ Tubing X Type Well Gas-Gas Dual
Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 12-24-62 Packer Baker "AO" 7200 Reservoir Temp. 171
Baker "D" 9050

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

No.	Flow Data ~~(Prover)~~ (Line) Size	~~(Choke)~~ (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Tubing Data Press. psig	Tubing Data Temp. °F.	Casing Data Press. psig	Casing Data Temp. °F.	D[illegible]
SI						2969				Over [illegible]
1.	3.068	1.750	900	11.0	55	2857				
2.	3.068	1.750	905	24.0	57	2773				
3.	3.068	1.750	900	43.0	57	2651				
4.	3.068	1.750	900	67.0	63	2515				
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate Q @ 15[illegible]
1.	20.15	100.23		1.0048	.9975	1.083	21[illegible]
2.	20.15	148.45		1.0029	.9975	1.083	3[illegible]
3.	20.15	198.16		1.0023	.9975	1.083	[illegible]
4.	20.15	247.35		.9971	.9975	1.081	5[illegible]
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio [illegible] cf/bbl.
Gravity of Liquid Hydrocarbons _____ deg.
F_c [illegible] $(1-e^{-s})$ [illegible]

Specific Gravity Separator Gas .603
Specific Gravity Flowing Fluid .7669
P_c 2982.2 P_c^2 8893.5

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2$ $(1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8397.6	505.9	2850.1	.9711
2.								[illegible]	[illegible]
3.									
4.									
5.									

Absolute Potential: _____ MCFPD; n _____

COMPANY _____

ADDRESS _____

AGENT and TITLE [illegible]

WITNESSED _____

COMPANY _____

REMARKS

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas [illegible] in the State, except those on which special orders are applicable. Three [illegible] of this form and the back pressure curve shall be filed with the Commission [illegible] 871, Santa Fe.

[illegible] log log paper used for plotting the back pressure curve shall be of at [illegible] three inch cycles.

NOMENCLATURE

Q - Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c - 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w - Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t - Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_m - Meter pressure, psia.

h_w - Differential meter pressure, inches water.

F_g - Gravity correction factor.

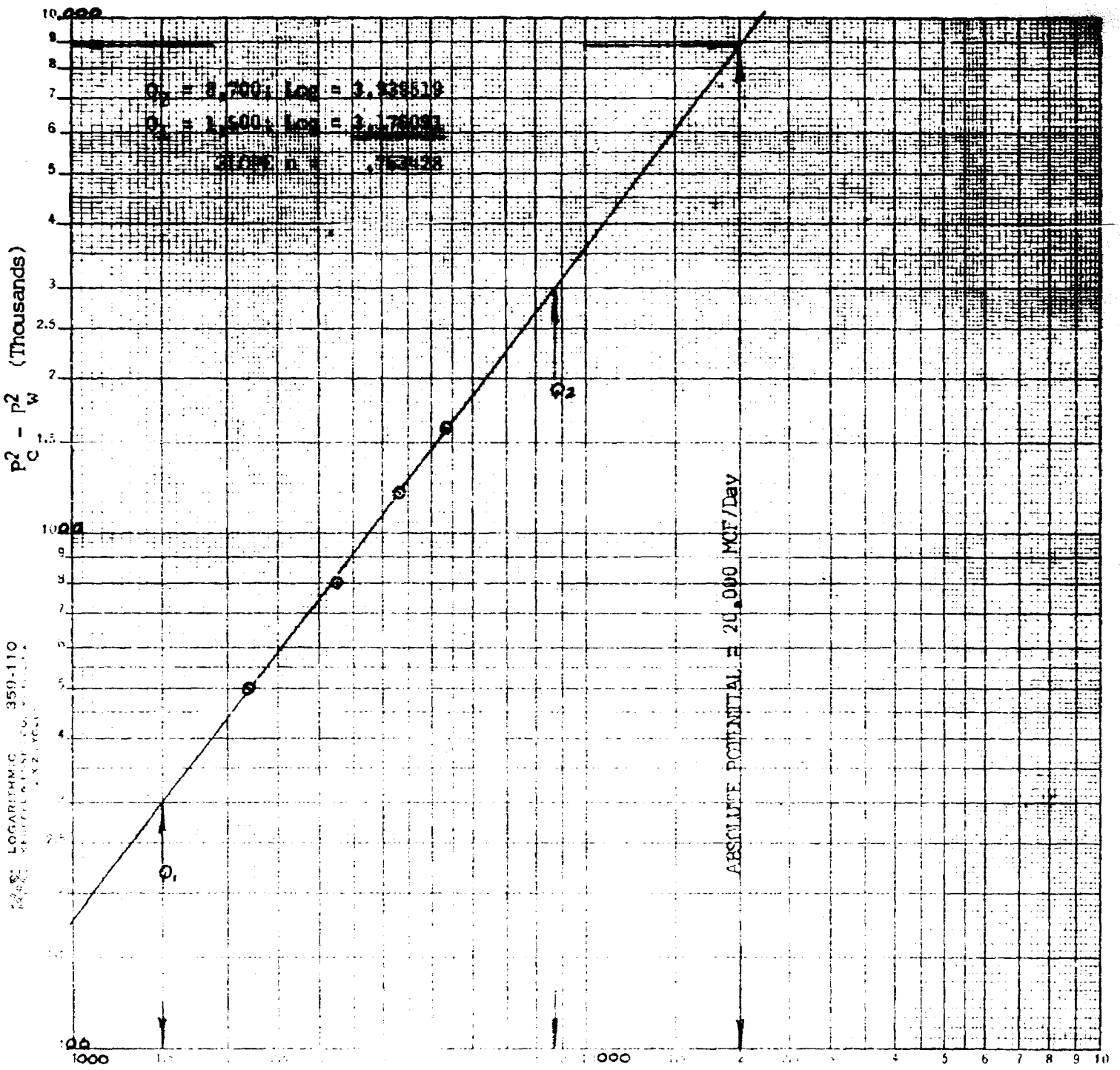
F_t - Flowing temperature correction factor.

F_{pv} - Supercompressability factor.

n - Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin "A" 1 (Lower)
LOCATION J-22-21S-23E
COUNTY Eddy
DATE 1/10-11/1963



Q-MCF/Day @ 15.025 PSIA - 60°F

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation (Penn) Canyon Dol. County [redacted]

Initial X Annual Special Date of [redacted]

Company Ralph Lowe Lease Indian Basin "A" Well No. [redacted]

Unit J Sec. 22 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 9385 Perf. 7505 To 7572

Tubing 10-RD Wt. 4.70 I.D. 1.995 Set at 7280 Perf. To

Gas Pay: From 7505 To 7572 L 7280 xMax =.667 -GL 4856 Bar. Pressure [redacted]

Producing Thru: Casing Tubing X Type Well Gas-Gas Dual Single-Bradenhead-G. G. or G.O. [redacted]

Date of Completion: 12-24-62 Packer Baker "K" 7280 Reservoir Temp. 146°F

OBSERVED DATA

Tested Through (Prover) (Choke) (Meter) Type Taps Flange

No.	Flow Data (Prover) (Line) Size	(Choke) (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Tubing Data Press. psig	Tubing Data Temp. °F.	Casing Data Press. psig	Casing Data Temp. °F.
SI						2354			Over 72 [redacted]
1.	3.068	1.750	655	14.5	67	2306			[redacted]
2.	3.068	1.750	655	30.0	77	2256			[redacted]
3.	3.068	1.750	655	50.0	79	2154			[redacted]
4.	3.068	1.750	655	90.0	69	2018			[redacted]
5.									

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ [redacted]
1.	20.15	98.43		.9933	.9721	1.063	[redacted]
2.	20.15	141.58		.9840	.9721	1.059	[redacted]
3.	20.15	200.23		.9822	.9721	1.059	[redacted]
4.	20.15	245.23		.9815	.9721	1.063	[redacted]
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 83.832 cf/bbl.
Gravity of Liquid Hydrocarbons 58.4 deg.
F_c 2.936 $(1-e^{-s})$ .268

Specific Gravity Separator Gas .635
Specific Gravity Flowing Fluid .7451
P_c 2367.2 P_c^2 5603.6

No.	P_w Pt (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2 (1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[redacted]	[redacted]	20.23	409.3	110.2	[redacted]	198.7	2344.1	.9902
2.	[redacted]	[redacted]	28.72	824.9	221.2	5382.8	220.8	2320.2	.9801
3.	[redacted]	[redacted]	40.53	1642.7	440.5	5163.2	440.4	2272.3	.9598
4.	[redacted]	[redacted]	52.30	2735.2	733.5	5071.3	532.3	2292.9	.9685
5.									

Absolute Potential: [redacted] MCFPD; n [redacted]
COMPANY [redacted]
ADDRESS [redacted]
AGENT and TITLE [redacted]
WITNESSED [redacted]
COMPANY [redacted]

REMARKS

INSTRUCTIONS

[illegible] form is to be used for reporting multi-point back pressure tests on gas [illegible] Mexico, except those on which special orders are applicable. Three [illegible] form and the back pressure curve shall be filed with the Commission [illegible], Santa Fe.

[illegible] log paper used for plotting the back pressure curve shall be of at [illegible] inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). [illegible] @ 15.025 psia and 60° F.

[illegible] = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

[illegible] = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

[illegible] = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

[illegible] = Meter pressure, psia.

[illegible] = Differential meter pressure, inches water.

[illegible] = Gravity correction factor.

[illegible] = Flowing temperature correction factor.

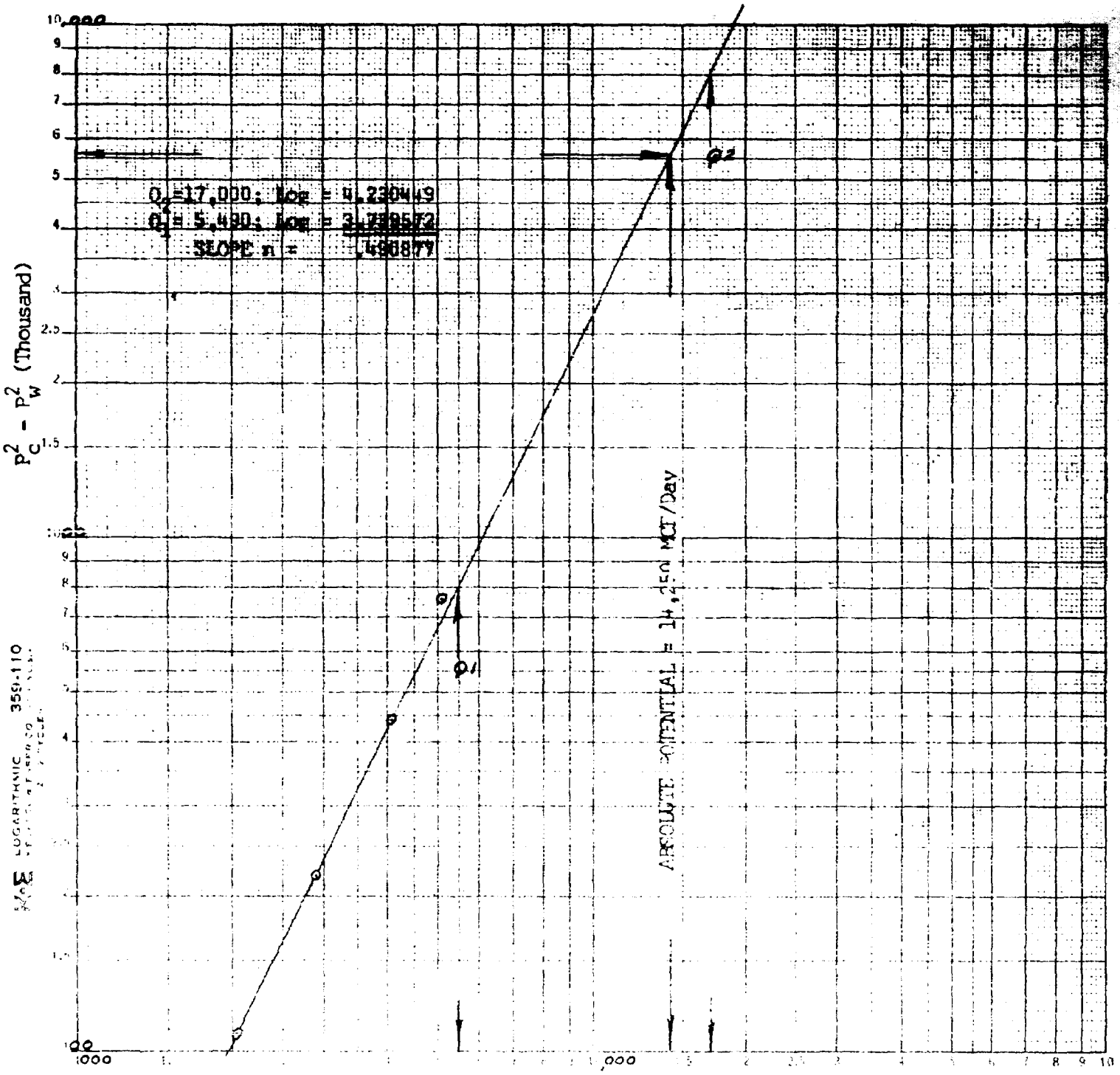
[illegible] = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin "A" 1 (Upper)
LOCATION J-22-21-S-23E

COUNTY Eddy
DATE 1/9-10/1963



Q-MCF/Day @ 15,025 PSIA - 60°F

V

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation Morrow Sand County Eddy

Initial X Annual ______ Special ______ Date of Test Nov. 17-18, 1962

Company Ralph Lowe Lease Indian Basin Well No. 1-(Lower)

Unit E Sec. 23 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 10,180 Perf. 9039 To 9263

Tubing 2 Wt. Buttress 4.6 I.D. 1.995 Set at 8990 Perf. ______ To ______

Gas Pay: From 9039 To 9263 L 8990 xGMix=.610 -GL 5484 Bar.Press. 13.2

Producing Thru: Casing ______ Tubing X Type Well Gas-Gas Dual

Baker "K" 7324 Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 10-3-62 Packer Baker "D" 7640 Reservoir Temp. 171

Baker "D" 8980

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

	Flow Data					Tubing Data		Casing Data		
No.	~~(Prover)~~ (Line) Size	~~(Choke)~~ (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	Duration of Flow Hr.
SI						2750				40
1.	4.026	2.500	510	10	63	2296				4
2.	4.026	2.500	510	24	67	1987				4
3.	4.026	2.500	510	42	67	1578				6
4.	4.026	2.500	510	65	65	818				9
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	42.13	72.33		.9971	.9975	1.044	3163
2.	42.13	112.05		.9933	.9975	1.043	4878
3.	42.13	148.24		.9933	.9975	1.043	6453
4.	42.13	184.41		.9952	.9975	1.043	8045
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio [illegible] cf/bbl. Specific Gravity Separator Gas .603
Gravity of Liquid Hydrocarbons [illegible] deg. Specific Gravity Flowing Fluid .7659
F_c [illegible] $(1-e^{-s})$ [illegible] P_c 2763.2 P_c^2 7635.3

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2 (1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[illegible]	[illegible]	[illegible]	967.8	[illegible]	[illegible]	1992.7	2375.8	.8597
2.	2000.2	[illegible]	[illegible]	2049.3	[illegible]	[illegible]	2896.8	2176.8	.7878
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3822.3	3812.4	1955.2	.7076
4.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.									

Absolute Potential: [illegible] MCFPD; n [illegible]
COMPANY [illegible]
ADDRESS [illegible]
AGENT and TITLE [illegible]
WITNESSED
COMPANY

REMARKS

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

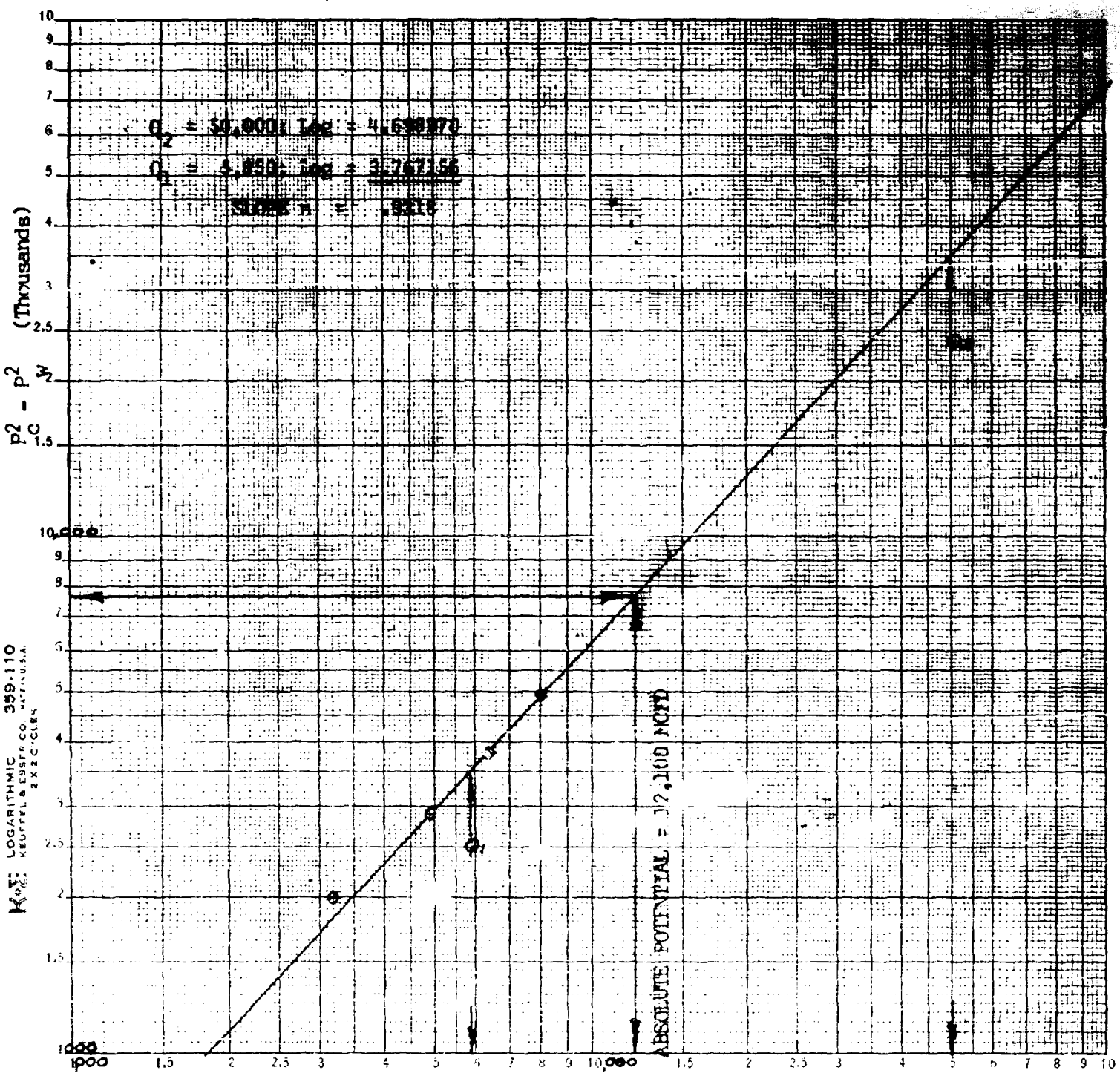
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin No. 1 (Lower)
LOCATION E 23 - 21S - 23E
COUNTY Eddy
DATE November 17-18, 1962



Q - MCFD - 15.025 psia

1-20-62

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation (Penn) Canyon Dol. County Eddy

Initial X Annual ______ Special ______ Date of Test Nov. 18-19, 1962

Company Ralph Lowe Lease Indian Basin Well No. 1 (Upper)

Unit E Sec. 23 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 10,100 Perf. 7376 To 7588

Tubing 2 Buttress Wt. 4.60 I.D. 1.995 Set at 7324 Perf. ______ To ______

Gas Pay: From 7376 To 7588 L 7324 xGLx = .788 -GL ______ Bar.Press. 13.2

Producing Thru: Casing ______ Tubing X Type Well Gas-Gas Dual

Baker "R" 7324 Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 10-3-1962 Packer Baker "D" 7640 Reservoir Temp. 146°F

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

	Flow Data					Tubing Data		Casing Data		
No.	~~(Prover)~~ (Line) Size	~~(Choke)~~ (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	Duration of Flow Hr.
SI						2376				44
1.	4.026	2.500	530	9.00	64	2150				4
2.	4.026	2.500	530	20.00	64	1915				4
3.	4.026	2.500	510	39.00	67	1597				4
4.	4.026	2.500	520	57.00	70	1225				4
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	42.13	69.92	543.2	.9962	.9721	1.053	3,004
2.	42.13	104.23	543.2	.9962	.9721	1.053	4,477
3.	42.13	142.84	523.2	.9933	.9721	1.047	6,084
4.	42.13	174.33	533.2	.9905	.9721	1.049	7,417
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 16,265 cf/bbl. Specific Gravity Separator Gas .635

Gravity of Liquid Hydrocarbons 61° @ 60 deg. Specific Gravity Flowing Fluid .7351

F_c 0.936 $(1-e^{-s})$ 0.330 P_c 2389.2 P_c^2 5708.9

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2 (1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	2163.2	4679.4	28.092	790.9	259.09	4973.9	739.0	2230.3	93.5
2.	1928.2	3717.9	40.688	1976.7	652.97	4370.9	1337.4	2090.7	80.7
3.	1610.2	2592.7	60.451	3654.3	1205.92	3798.6	1909.7	1949.0	67.4
4.	1238.2	1533.1	73.695	5430.9	1792.20	3325.3	2383.6	1823.5	51.8
5.									

Absolute Potential: 16,100 MCFPD; n .805

COMPANY Ralph Lowe

ADDRESS Box 832, Midland, Texas

AGENT and TITLE [signature] [illegible] Petroleum Engineer

WITNESSED ______

COMPANY ______

Point No. Distillate Bbl/day Water Bbl/day

REMARKS [illegible]

[illegible]

INSTRUCTIONS

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The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

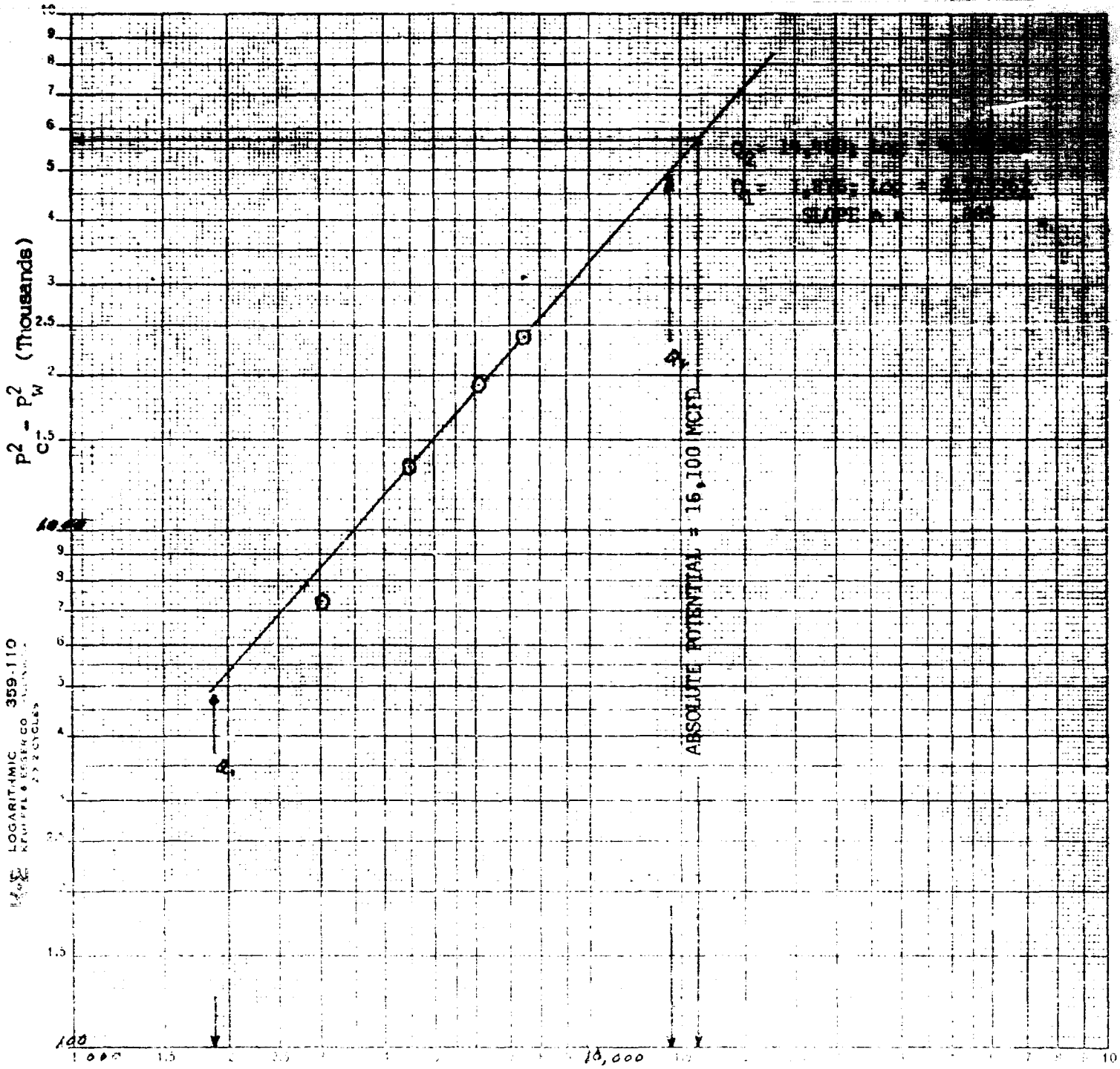
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin No. 1 (Upper)
LOCATION E 23 - 21S- 23E
COUNTY Eddy
DATE November 18-19, 1962



Q - MCFD- 15.025 psia

Ralph Lowe

Phone MU 4-7441

Box 832 Midland, Texas

February 9, 1963

Mr. Dan Nutter
New Mexico Oil & Gas Conservation Commission
Santa Fe, New Mexico

Dear Dan:

In line with your verbal request, enclosed are two (2) additional sets of the exhibits used in our Indian Basin Gas Pools spacing hearing of February 6th.

If you should need further information please advise.

Sincerely,

Harvin L. Landua

Harvin L. Landua

Encl.
HLL:jc

DRAFT

JMD/esr
February 14, 1963

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 No. 2750

Order No. R- 2441

APPLICATION OF RALPH LOWE
TO CREATE A NEW POOL FOR
MORROW GAS PRODUCTION AND
FOR SPECIAL POOL RULES,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on February 6, 1963, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this _____ day of February, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Ralph Lowe, seeks the creation of a new gas pool for Morrow production and the promulgation of temporary special rules and regulations governing said pool, including a provision for 640-acre spacing units.

(3) That a new gas pool for Morrow production should be created and designated the Indian Basin-Morrow Gas Pool. This pool was discovered by the Ralph Lowe Indian Basin Well No. 1, located in Unit E of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. The top of the perforations in the Morrow formation is at ~~8945~~ 9039 feet.

(4) That temporary special rules and regulations establishing 640-acre spacing units should be promulgated for the subject

Memo

From
D. S. NUTTER
CHIEF ENGINEER

To
upper Pennsylvanian

Memo

From
D. S. NUTTER
CHIEF ENGINEER

To
and the establishment of
temporary pool rules
therefor, including a
provision for 640 acre
Spacing units.

pool in order to prevent the possibility of economic loss resulting from the drilling of unnecessary wells and in order to allow the operators in the subject pool to gather information concerning the reservoir characteristics of the pool.

(5) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(6) That ~~the temporary~~ special rules and regulations should be established for a one year ~~period~~ temporary period to expire from the date that a pipeline connection is first obtained for a well in the pool, ~~and~~ that during this ~~temporary~~ temporary period all operators in the subject pool should gather all available information relative to drainage and recoverable reserves.

(7) That this case should be reopened at an examiner hearing one year from the date that a pipeline connection is first obtained for a well in the Indian Basin-Morrow Gas Pool, at which time the operators in the subject pool should appear and show cause why the Indian Basin-Morrow Gas Pool should not be developed on 160-acre spacing units.

(8) That the first operator to ~~acquire~~ obtain a pipeline connection for a well in the Indian Basin-Morrow Gas Pool should notify the Commission in writing of such fact, and that the Commission should thereupon issue a supplemental order designating an exact date for reopening this case.

IT IS THEREFORE ORDERED:

(1) That a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production is hereby created and designated the Indian Basin-Morrow Gas Pool, consisting of the following-described area:

TOWNSHIP 21 SOUTH, RANGE 23 EAST, NMPM
Section 22: All
Section 23: All

(2) That special rules and regulations for the Indian Basin-Morrow Gas Pool are hereby promulgated as follows, ~~effective~~ effective March 1, 1963.

SPECIAL RULES AND REGULATIONS
FOR THE
INDIAN BASIN-MORROW GAS POOL

RULE 1. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool or in the Morrow formation within one mile of the Indian Basin-Morrow Gas Pool, and not nearer to or within the limits of another designated Morrow pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool shall be located on a standard unit containing 640 acres, more or less, consisting of a single governmental section.

RULE 3. The Secretary-Director may grant an exception to the requirements of Rule 2 without notice and hearing when an application has been filed for a non-standard unit and the unorthodox size or shape of the unit is necessitated by a variation in the legal subdivision of the United States Public Lands Survey, or the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of quarter-quarter sections or lots that are contiguous by a common bordering side.

(b) The non-standard unit lies wholly within a single governmental section and contains less acreage than a standard unit.

(c) The applicant presents written consent in the form of waivers from all offset operators and from all operators owning interests in the section in which ~~any part of~~ the non-standard unit is situated and which acreage is not included in said non-standard unit.

(d) In lieu of Paragraph (c) of this rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if, ~~after a period of 30 days~~, no such operator has entered an objection to the formation of such non-standard unit within 30 days after the Secretary-Director has received the application.

RULE 4. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool shall be located no nearer than 1650 feet to the outer boundary of the section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 5. The Secretary-Director may grant an exception to the requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application.

IT IS FURTHER ORDERED:

(1) That any well presently drilling to or completed in the Morrow formation within the Indian Basin-Morrow Gas Pool or within one mile of the Indian Basin-Morrow Gas Pool that will not comply with the well location requirements of Rule 4 is hereby granted an exception to the requirements of Rule 4. The operator shall notify the Artesia District Office in writing of the name and location of the well on or before March 1, 1963.

(2) That any operator desiring to dedicate 640 acres to a well presently drilling to or completed in the Indian Basin-Morrow Gas Pool shall file a new Form C-128 with the Commission on or before March 1, 1963.

(3) That this case shall be reopened at an examiner hearing one year from the date that a pipeline connection is first obtained for a well in the Indian Basin-Morrow Gas Pool, at which time the operators in the subject pool may appear and show cause the Indian Basin-Morrow Gas Pool should not be developed on 160-acre spacing units.

(4) That the first operator to obtain a pipeline connection for a well in the Indian Basin-Morrow Gas Pool shall notify the Commission in writing of such fact, and that the Commission

will thereupon issue a supplemental order designating an exact date for reopening this case.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

Ralph Lowe
Development Cost
Indian Basin Wells #1 & #2

	Total	Indian Basin Well #1	Indian Basin A-1 Well #2
Supplies	$ 1,796.47	$ 1,152.81	$ 643.66
Trucking	1,737.66	1,515.90	221.76
Repairs & Welding	1,796.17	1,644.09	152.08
Geological & Surveying	38,701.77	29,631.51	9,070.26
Fuel	720.63	720.63	
Mud	39,754.36	23,829.49	15,924.87
Drilling Expense	336,316.97	189,064.22	147,252.75
Special Services	29,079.68	22,195.95	6,883.73
Tool Rental	33,889.72	13,576.43	20,313.29
Cement & Cementing Services	19,407.56	13,734.63	5,672.93
Acidizing	18,745.94	18,651.33	94.61
Perforating	17,245.40	13,518.09	3,727.31
Superintendent Expense	2,054.67	1,200.82	853.85
Casing	93,719.58	46,859.79	46,859.79
Tubing	46,183.59	28,617.57	17,566.02
Line Pipe	1,049.47	640.70	408.77
Large Fittings & Equipment	5,664.78	2,832.39	2,832.39
Well Head Equipment	25,380.44	12,690.22	12,690.22
Miscellaneous Intangibles	7,636.30	5,437.03	2,199.27
Miscellaneous Tangibles	5,555.71	3,906.23	1,649.48
Water	105.00		105.00
Test Tanks	1,000.00		1,000.00
Total	$ 727,541.87	$ 431,419.83	$ 296,122.04

The above figures represent the cost of the Indian Basin Well #1 and the Indian Basin A-1 Well #2 recorded on Ralph Lowe's books as at December 31, 1962.

RALPH LOWE

By_____
V. H. Van Horn, Jr.
Office Manager

CASE 2750: Application of Ralph Lowe to create a new pool for Morrow gas production, and for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Morrow production in Sections 22 and 23, Township 21 South, Range 23 East, and the establishment of temporary pool rules therefor, including a provision for 640-acre spacing units.

CASE 2751: Application of Gulf Oil Corporation for a triple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of its W. A. Ramsay (NCT-C) Well No. 4, located in Unit M of Section 36, Township 24 South, Range 37 East, as a triple completion (conventional) to produce oil from the Fusselman, Montoya, and Waddell Pools, North-Justis Field, Lea County, New Mexico.

CASE 2752: In the matter of the hearing called by the Commission upon its own motion to allow all interested parties to appear and present evidence to determine the proper location of the survey line dividing Sections 3, 10, 15, 22, 27 and 34 from Sections 2, 11, 14, 23, 26, and 35, respectively, Township 10 South, Range 32 East, NMPM, Lea County, New Mexico. The Commission also will consider the approval of any non-standard location which might result from such determination.

iqg/

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 6, 1963

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Elvis A. Utz, as alternate examiner:

CASE 2746: In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Continental National Insurance Group and all other interested parties to appear and show cause why the Kenneth V. Barbee Well No. 1, located 1980 feet from the South line and 660 feet from the East line of Section 9, Township 11 South, Range 25 East, NMPM, Chaves County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.

CASE 2747: Application of El Paso Natural Gas Company for cancellation of a non-standard gas proration unit, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks cancellation of a non-standard gas proration unit comprising the SW/4 of Section 23 and the NW/4 of Section 26, Township 31 North, Range 7 West, Blanco-Mesaverde Gas Pool, San Juan County, New Mexico, said unit having been established and designated Block "N" by Order No. R-1066.

CASE 2480: (Reopened)
In the matter of Case 2480 being reopened pursuant to the provisions of Order No. R-2182, which order established temporary 80-acre proration units for the Henshaw-Wolfcamp Pool, Eddy County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

CASE 2748: Application of Ralph Lowe for approval of a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Indian Hills Unit Area, comprising 4,480 acres of Federal and State lands in Township 21 South, Range 24 East, Eddy County, New Mexico.

CASE 2749: Application of Ralph Lowe to create a new pool for Upper Pennsylvanian gas production, and for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Upper Pennsylvanian gas production in Sections 22 and 23, Township 21 South, Range 23 East and the establishment of temporary pool rules therefor, including a provision for 640-acre spacing units.

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation Morrow Sand County Eddy

Initial X Annual ____ Special ____ Date of Test Nov. 17-18, [illegible]

Company Ralph Lowe Lease Indian Basin Well No. 1 (Lower)

Unit E Sec. 23 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 10,100 Perf. 9039 To 9263

Tubing 2 Buttress Wt. 4.6 I.D. 1.995 Set at 8990 Perf. ____ To ____

Gas Pay: From 9039 To 9263 L 8990 xGLx = .610 -GL 5484 Bar.Press. [illegible]

Producing Thru: Casing ____ Tubing X Type Well Gas-Gas Dual

Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 10-3-62 Packer Baker "K" 7324 / Baker "D" 7840 / Baker "D" 8980 Reservoir Temp. 171

OBSERVED DATA

Tested Through (Prover) (Choke) (Meter) Type Taps Flange

	Flow Data					Tubing Data		Casing Data		
No.	(Prover) (Line) Size	(Choke) (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	Duration of Flow
SI						2750				40
1.	4.026	2.500	510	10	63	2296				[illegible]
2.	4.026	2.500	510	24	67	1987				[illegible]
3.	4.026	2.500	510	42	67	1573				6
4.	4.026	2.500	510	65	65	918				9
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	42.13	72.33		.9971	.9975	1.044	3163
2.	42.13	112.06		.9933	.9975	1.043	4878
3.	42.13	148.24		.9933	.9975	1.043	6453
4.	42.13	184.41		.9952	.9975	1.043	8045
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 413,100 cf/bbl.
Gravity of Liquid Hydrocarbons 58.0° @ 60 deg.
F_c 9.936 $(1-e^{-s})$ .308

Specific Gravity Separator Gas .603
Specific Gravity Flowing Fluid .7669
P_c 2763.2 P_c^2 7635.3

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$\frac{(F_cQ)^2}{(1-e^{-s})}$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	2309.2	5332.4	31.43	987.8	310.2	5642.6	1992.7	2375.4	.8597
2.	2000.2	4000.8	48.47	2349.3	737.7	4738.5	2896.8	2176.8	.7878
3.	[illegible]	[illegible]	64.12	[illegible]	[illegible]	3822.5	3812.8	1955.2	.7076
4.	[illegible]	[illegible]	79.99	6398.4	2008.5	2697.5	4937.8	1642.4	.5944
5.									

Absolute Potential: [illegible] MCFPD; n [illegible]
COMPANY
ADDRESS
AGENT and TITLE
WITNESSED
COMPANY

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas [illegible] in the State, except those on which special orders are applicable. Three [illegible] of this form and the back pressure curve shall be filed with the Commission [illegible] 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at [illegible] three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

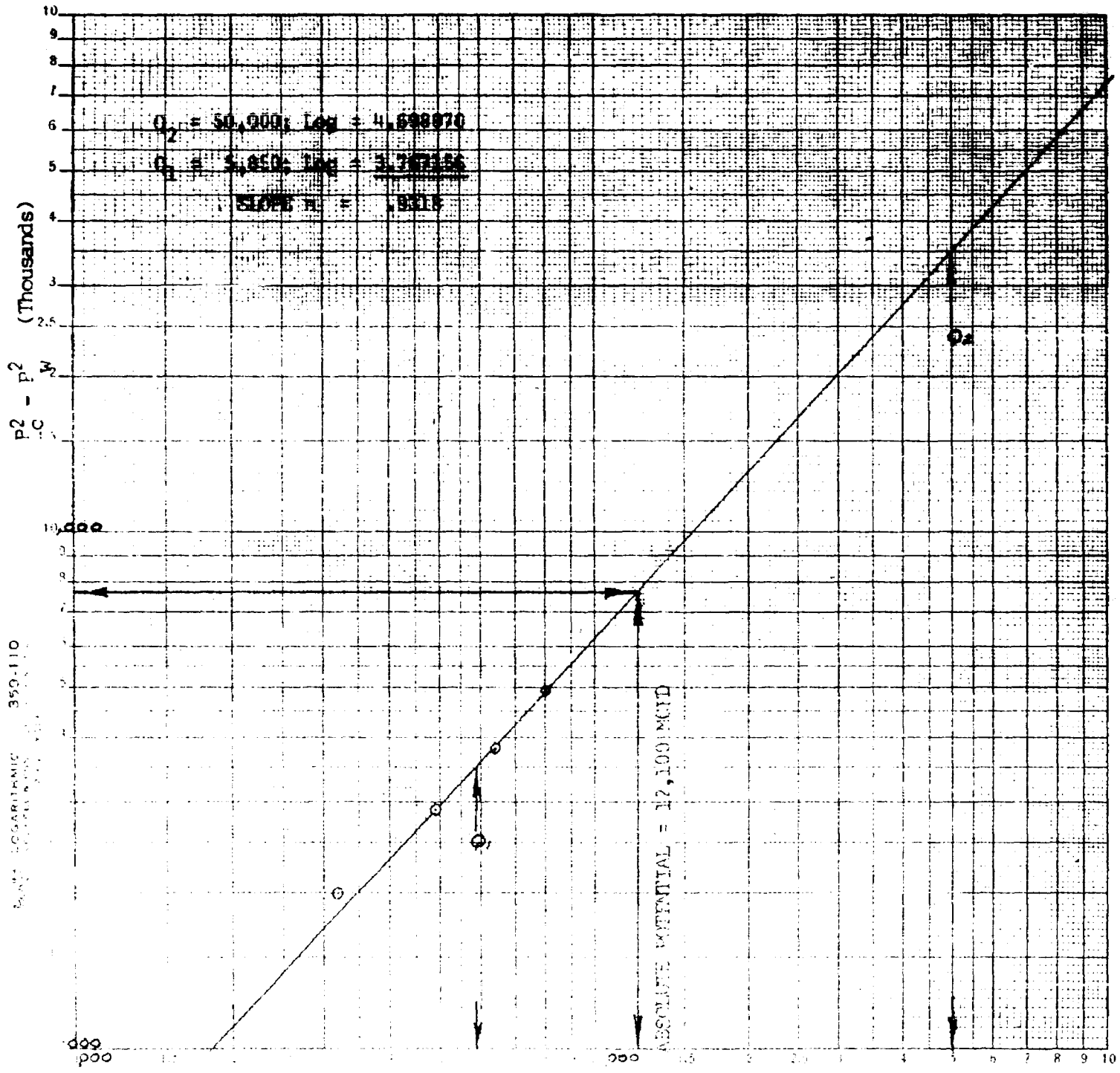
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin No. 1 (Lower)
LOCATION E 23 - 21S - 23E
COUNTY Eddy
DATE November 17-18, 1962



P_c = P_{wf} = 15,025 psia

VI

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-[illegible]

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation (Penn) Canyon Dol. County Eddy

Initial X Annual ____ Special ____ Date of Test 1/9-10/1963

Company Ralph Lowe Lease Indian Basin "A" Well No. 1 (Upper)

Unit J Sec. 22 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 9385 Perf. 7505 To 7572

Tubing 2"10-RD Wt. 4.70 I.D. 1.995 Set at 7280 Perf. ____ To ____

Gas Pay: From 7505 To 7572 L 7280 xGix =.667 -GL 4856 Bar.Press. 13.2

Producing Thru: Casing ____ Tubing X Type Well Gas-Gas Dual

Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 12-24-62 Packer Baker "K" 7280 Reservoir Temp. 146°F

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

No.	Flow Data: (Prover) (Line) Size	(Choke) (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Tubing Data: Press. psig	Temp. °F.	Casing Data: Press. psig	Temp. °F.	Duration of Flow Hr.
SI						2354				Over 72
1.	3.068	1.750	655	14.5	67	2306				5
2.	3.068	1.750	655	30.0	77	2256				6
3.	3.068	1.750	655	60.0	79	2154				6
4.	3.068	1.750	655	90.0	69	2018				6
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	20.15	98.43		.9933	.9721	1.063	2036
2.	20.15	141.58		.9840	.9721	1.059	2890
3.	20.15	200.23		.9822	.9721	1.059	4079
4.	20.15	245.23		.9915	.9721	1.063	5062
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 83,832 cf/bbl. Specific Gravity Separator Gas .635

Gravity of Liquid Hydrocarbons 58.0 deg. Specific Gravity Flowing Fluid .7451

F_c 0.986 $(1-e^{-s})$ .208 P_c 2367.2 P_c^2 5603.6

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2 (1-e^{-s})$	P_w2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	2319.2	5378.7	20.23	409.3	118.2	5434.9	168.7	2344.1	.9902
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2320.2	.9801
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2272.3	.9599
4.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.									

Absolute Potential: ____ MCFPD; n ____

COMPANY

ADDRESS

AGENT and TITLE

WITNESSED

COMPANY

REMARKS

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

F_t = Flowing temperature correction factor

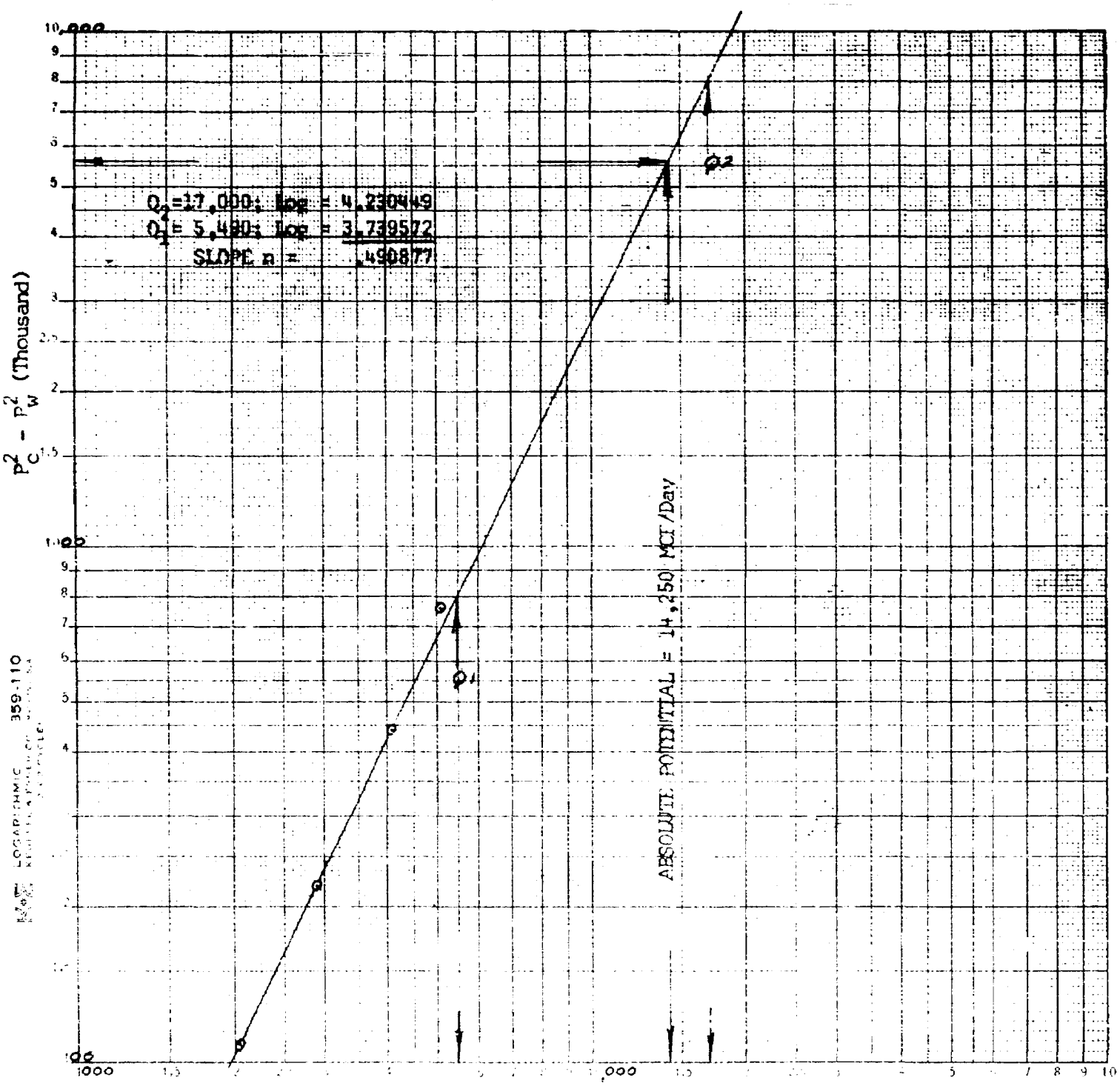
F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin "A" 1 (Upper)
LOCATION J-22-21-S-23E

COUNTY Eddy
DATE 1/9-10/1963



Q-MCF/Day @ 15.025 PSIA - 60°F

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-1[illegible]
Revised 12-[illegible]

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation Morrow Sand County Eddy

Initial X Annual ______ Special ______ Date of Test 1/10-11/1963

Company Ralph Lowe Lease Indian Basin "A" Well No. 1 (Lower)

Unit J Sec. 22 Twp. 22S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 5.276 Set at 9385 Perf. 9118 To 9266

Tubing 2" 10-RD Wt. 4.70 I.D. 1.995 Set at 9053 Perf. ______ To ______

Gas Pay: From 9118 To 9266 L 9053 xG Mix =.608 -GL 5504 Bar.Press. 13.2

Producing Thru: Casing ______ Tubing X Type Well Gas-Gas Dual

Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 12-24-62 Packer Baker "K" 7280 / Baker "D" 9050 Reservoir Temp. 171

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

	Flow Data					Tubing Data		Casing Data		
No.	~~(Prover)~~ (Line) Size	~~(Choke)~~ (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	Duration of Flow Hr.
SI						2969				Over 72
1.	3.068	1.750	900	11.0	55	2857				6
2.	3.068	1.750	895	24.0	57	2773				6
3.	3.068	1.750	910	43.0	57	2651				6
4.	3.068	1.750	900	67.0	63	2515				6
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	20.35	100.23		1.0048	.9975	1.083	2193
2.	20.35	148.45		1.0029	.9975	1.083	3241
3.	20.35	198.15		1.0029	.9975	1.083	4327
4.	20.35	247.35		.9971	.9975	1.083	5360
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio [illegible] cf/bbl.
Gravity of Liquid Hydrocarbons [illegible] deg.
F_c [illegible] $(1-e^{-s})$ [illegible]

Specific Gravity Separator Gas .603
Specific Gravity Flowing Fluid ~~.7669~~
P_c 2982.2 P_c^2 [illegible]

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$\frac{(F_cQ)^2}{(1-e^{-s})}$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.9711
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.9537
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.	[illegible]								
5.									

Absolute Potential: ______ MCFPD; n ______
COMPANY ______
ADDRESS ______
AGENT and TITLE [illegible]
WITNESSED ______
COMPANY ______

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

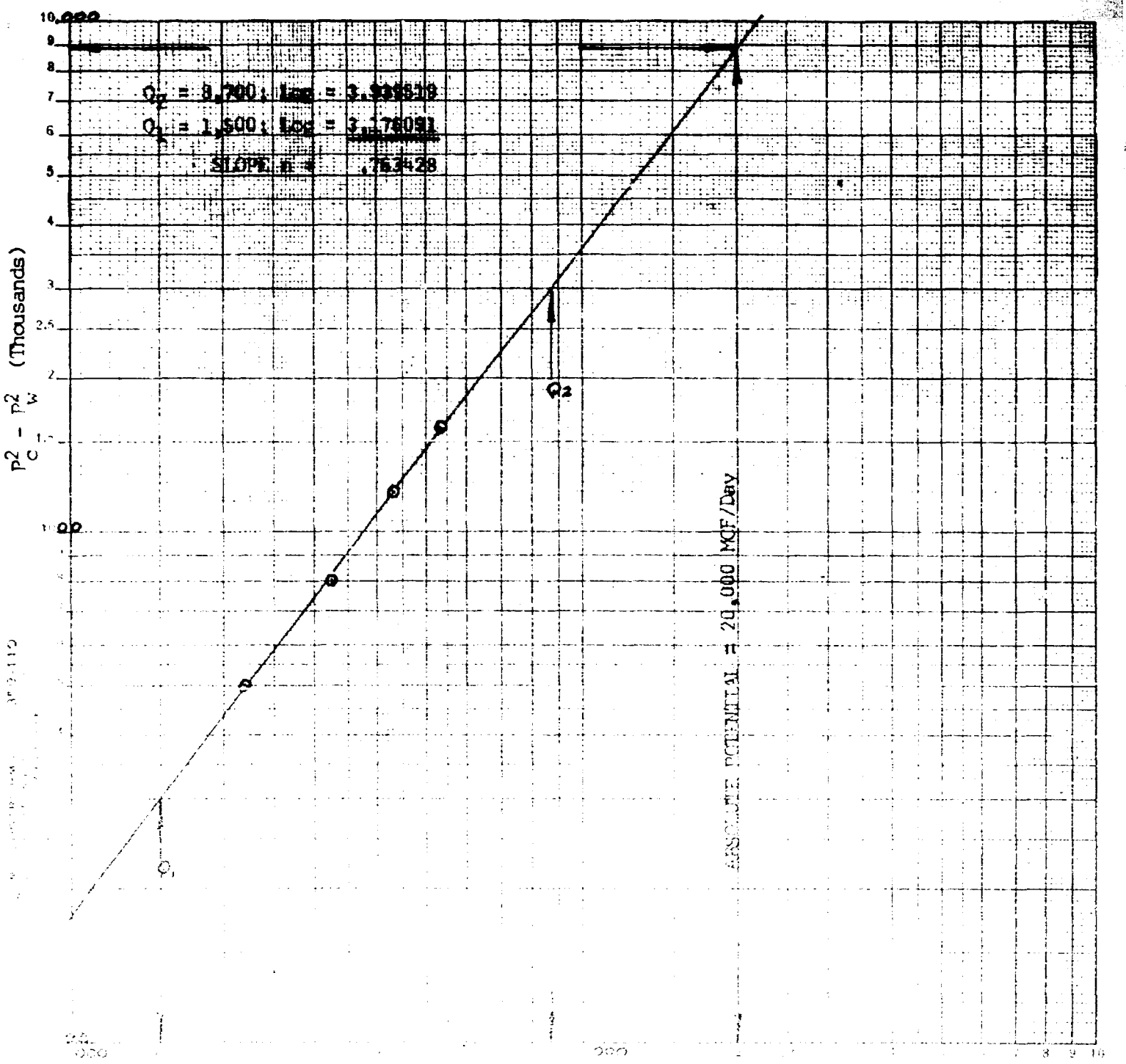
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY	Ralph Lowe
WELL	Indian Basin "A" 1 (Lower)
LOCATION	J-22-21S-23E
COUNTY	Eddy
DATE	1/10-11/1963



IV

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation (Penn) Canyon Dol. County Eddy

Initial X Annual ___ Special ___ Date of Test Nov. 18-19, 1962

Company Ralph Lowe Lease Indian Basin Well No. 1 (Upper)

Unit E Sec. 23 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 10,100 Perf. 7376 To 7588

Tubing 2 Buttress Wt. 4.60 I.D. 1.995 Set at 7324 Perf. ___ To ___

Gas Pay: From 7376 To 7588 L 7324 xG Mix = .788 -GL ___ Bar.Press. 13.2

Producing Thru: Casing ___ Tubing X Type Well Gas-Gas Dual

Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 10-3-1962 Packer Baker "K" 7324 Baker "D" 7540 Reservoir Temp. 148°F

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

	Flow Data					Tubing Data		Casing Data		
No.	~~(Prover)~~ (Line) Size	~~(Choke)~~ (Orifice) Size	Press. psig	Diff. h_w	Temp. °F.	Press. psig	Temp. °F.	Press. psig	Temp. °F.	Duration of Flow Hr.
SI						2376				44
1.	4.026	2.500	530	9.00	64	2130				4
2.	4.026	2.500	530	20.00	[illegible]	[illegible]				4
3.	4.026	2.500	510	39.00	67	1597				4
4.	4.026	2.500	520	57.00	70	1225				4
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	42.13	69.92	543.2	.9962	.9721	1.053	3,004
2.	42.13	104.23	543.2	.9962	.9721	1.053	4,477
3.	42.13	142.84	523.7	.9933	.9721	1.047	6,084
4.	42.13	170.33	533.2	.9905	.9721	1.049	7,417
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 16,266 cf/bbl. Specific Gravity Separator Gas .835

Gravity of Liquid Hydrocarbons ~~[illegible]~~ deg. Specific Gravity Flowing Fluid ~~.7351~~

F_c [illegible] $(1-e^{-s})$ [illegible] P_c [illegible] P_c^2 [illegible]

No.	P_w / P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$(F_cQ)^2 (1-e^{-s})$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.									

Absolute Potential: ___ MCFPD; n ___

COMPANY

ADDRESS

AGENT and TITLE

WITNESSED

COMPANY

REMARKS

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

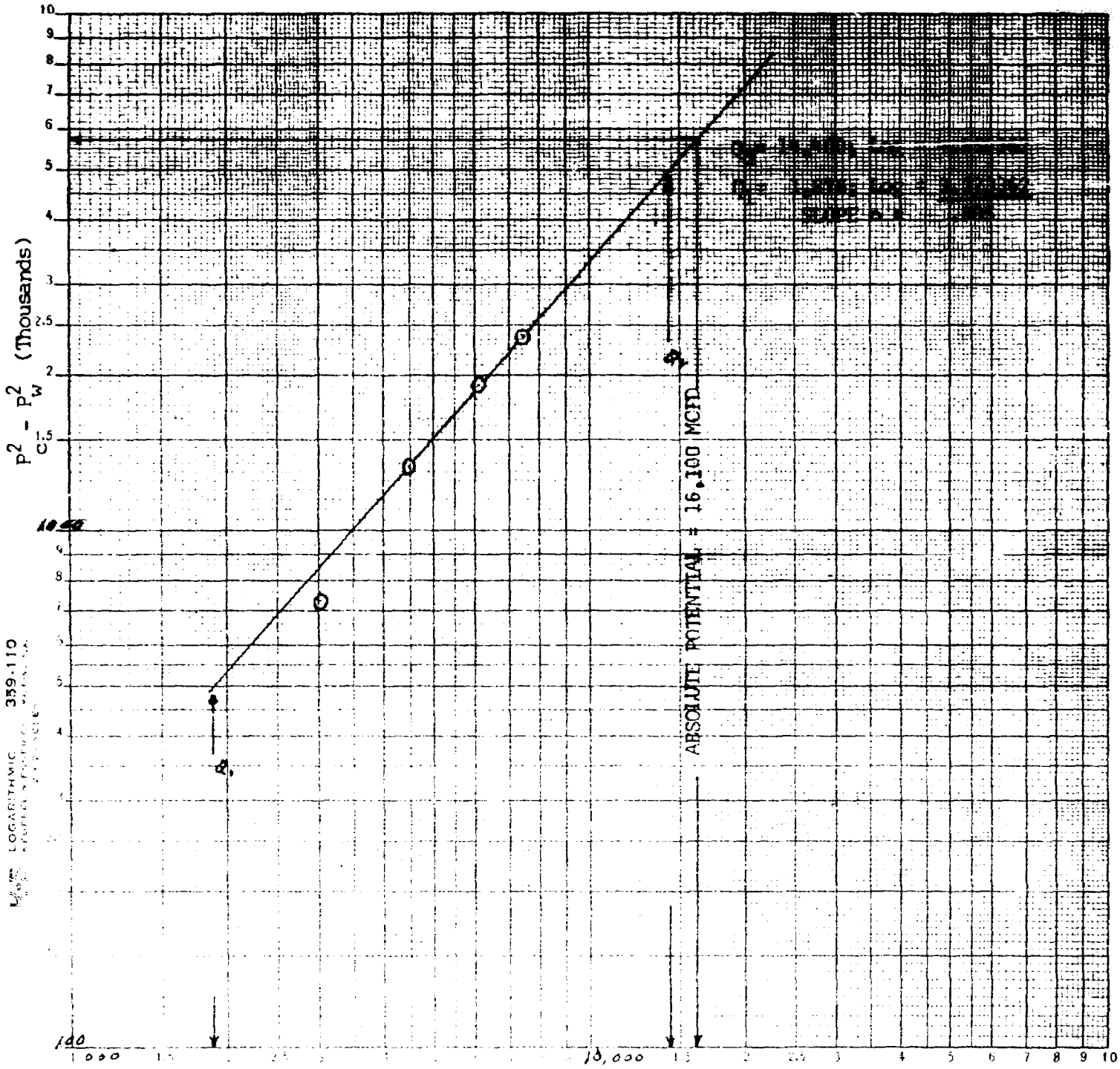
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin No. 1 (Upper)
LOCATION E 23 - 21S- 23E
COUNTY Eddy
DATE November 16-19, 1962



Q - MCFD- 15.025 psia

Ralph Lowe
Development Cost
Indian Basin Wells #1 & #2

	Total	Indian Basin Well #1	Indian Basin A-1 Well #2
Supplies	$ 1,796.47	$ 1,152.81	$ 643.66
Trucking	1,737.66	1,515.90	221.76
Repairs & Welding	1,796.17	1,644.09	152.08
Geological & Surveying	38,701.77	29,631.51	9,070.26
Fuel	720.63	720.63	
Mud	39,754.36	23,829.49	15,924.87
Drilling Expense	336,316.97	189,064.22	147,252.75
Special Services	29,079.68	22,195.95	6,883.73
Tool Rental	33,889.72	13,576.43	20,313.29
Cement & Cementing Services	19,407.56	13,734.63	5,672.93
Acidizing	18,745.94	18,651.33	94.61
Perforating	17,245.40	13,518.09	3,727.31
Superintendent Expense	2,054.67	1,200.82	853.85
Casing	93,719.58	46,859.79	46,859.79
Tubing	46,183.59	28,617.57	17,566.02
Line Pipe	1,049.47	640.70	408.77
Large Fittings & Equipment	5,664.78	2,832.39	2,832.39
Well Head Equipment	25,380.44	12,690.22	12,690.22
Miscellaneous Intangibles	7,636.30	5,437.03	2,199.27
Miscellaneous Tangibles	5,555.71	3,906.23	1,649.48
Water	105.00		105.00
Test Tanks	1,000.00		1,000.00
Total	$ 727,541.87	$ 431,419.83	$ 296,122.04

The above figures represent the cost of the Indian Basin Well #1 and the Indian Basin A-1 Well #2 recorded on Ralph Lowe's books as at December 31. 1962.

RALPH LOWE

By V. H. Van Horn, Jr.
V. H. Van Horn, Jr.
Office Manager

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

September 7, 1962

REPLY TO
P. O. BOX 4337
MIDLAND, TEXAS

Mr. Ralph Lowe
Box 832
Midland, Texas

Subject: Core Analysis
Indian Basin No. 1 Well
Wildcat
Eddy County, New Mexico
Location: Sec. 23-T21S-R23E

Dear Sir:

Pennsylvanian formation analyzed from 7610 to 7635 and 9200.0 to 9204.5 feet is interpreted to be gas productive where permeable. An economic completion will be entirely dependent upon additional productive formation being present above or below the cored intervals. A formation treatment will be necessary for satisfactory rates of flow. Summaries of average core analysis data are presented on page one of the report.

Formation analyzed from 9044 to 9050 feet is impermeable and nonproductive and Devonian formation analyzed from 10,095 to 10,111 is interpreted to be water productive where permeable.

We sincerely appreciate this opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

R S Bynum Jr

R. S. Bynum, Jr.,
Division Manager

RSB:HC:dc

CL 318

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

DALLAS, TEXAS

Page 1 of 1 File WP-3-1945
Well Indian Basin No. 1

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Pennsylvanian 7610.0-7635.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		25.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		48.7
FEET OF CORE INCLUDED IN AVERAGES		14.4	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	48.7
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	0.6	OIL GRAVITY: °API		
	90°	0.3			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	8.6	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	4.3			
AVERAGE POROSITY: PER CENT		5.0	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		1.4	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

FORMATION NAME AND DEPTH INTERVAL: Pennsylvanian 9200.0-9204.5

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		4.5	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		19.3
FEET OF CORE INCLUDED IN AVERAGES		4.5	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	19.3
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	2.5	OIL GRAVITY: °API		
	90°	2.2			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	11	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	9.9			
AVERAGE POROSITY: PER CENT		6.6	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		2.2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

Distribution of Final Reports

3 Copies	Mr. Ralph Lowe Box 832 Midland, Texas
6 Copies	Mr. N. E. Webernick Marathon Oil Company Box 1398 Roswell, New Mexico
5 Copies	Mr. J. W. Hodges Sinclair Oil & Gas Co. Box 1677 Roswell, New Mexico
4 Copies	Mr. D. C. Fish Kerr-McGee Oil Industries, Inc. Globe News Bldg. Amarillo, Texas

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

January 4, 1963

REPLY TO
P. O. BOX 4337
MIDLAND, TEXAS

Mr. Ralph Lowe
Box 832
Midland, Texas

Subject: Core Analysis
Indian Basin No. 1-A Well
Eddy County, New Mexico
Location: Sec. 22-T21S-R23E

Dear Sir:

Canyon formation analyzed between 7374.0 and 7660.4 feet is interpreted to be gas productive where permeable. The productive capacity is considered adequate for satisfactory production rates without formation treatment. Average core analysis values are presented on page one of this report.

From 7660.4 to 7675.6 feet, Canyon formation exhibits high total water saturations and is interpreted to be both water and gas productive.

Strawn sand analyzed from 8667 to 8678 feet is considered to be gas productive where permeable; however, due to low permeability, a completion attempt is not recommended. Average core analysis values also are presented for the interval on page one.

Permeable Morrow formation analyzed at intervals between 9132.0 and 9324.7 feet is interpreted to be gas productive with adequate productive capacity for satisfactory rates of production without formation treatment. A summary of average core analysis values is presented on page two.

Due to lower residual oil and high total water saturations, the interval from 9324.7 to 9360.0 feet is interpreted to be water productive where permeable.

We appreciate this opportunity to be of service.

Very truly yours,

Core Laboratories, Inc.

R S Bynum Jr

R. S. Bynum, Jr.,
Division Manager

RSB:JR:dc

CL 310

CORE LABORATORIES, INC
Petroleum Reservoir Engineering
DALLAS, TEXAS

 File WP-3-2023
Well Indian Basin No. 1-A

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Canyon 7374.0-7660.4

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		273.9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		35.4
FEET OF CORE INCLUDED IN AVERAGES		181.4	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	35.4
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	44	OIL GRAVITY: °API		
	90°	13			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	7982	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	2358			
AVERAGE POROSITY: PER CENT		3.7	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		4.8	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

FORMATION NAME AND DEPTH INTERVAL: Strawn 8667.0-8678.0

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		11.0	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		54.4
FEET OF CORE INCLUDED IN AVERAGES		6.2	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	54.4
AVERAGE PERMEABILITY: MILLIDARCYS	Max.	0.2	OIL GRAVITY: °API		
	90°	0.2			
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max.	1.2	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
	90°	1.2			
AVERAGE POROSITY: PER CENT		8.5	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		2.2	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. (*Please refer to footnotes for further discussion of recovery estimates.*)

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

CL 519

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Well Indian Basin No. 1-A

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

FORMATION NAME AND DEPTH INTERVAL: Morrow 9132.0-9324.7

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		187.9	AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE		48.5
FEET OF CORE INCLUDED IN AVERAGES		18.0	AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	(c)	48.5
AVERAGE PERMEABILITY: MILLIDARCYS	Max. 90°	12 11	OIL GRAVITY: °API		
PRODUCTIVE CAPACITY: MILLIDARCY-FEET	Max. 90°	216 198	ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL		
AVERAGE POROSITY: PER CENT		10.8	ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL		
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		3.9	CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT		

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

FORMATION NAME AND DEPTH INTERVAL:

FEET OF CORE RECOVERED FROM ABOVE INTERVAL		AVERAGE TOTAL WATER SATURATION: PER CENT OF PORE SPACE	
FEET OF CORE INCLUDED IN AVERAGES		AVERAGE CONNATE WATER SATURATION: PER CENT OF PORE SPACE	
AVERAGE PERMEABILITY: MILLIDARCYS		OIL GRAVITY: °API	
PRODUCTIVE CAPACITY: MILLIDARCY-FEET		ORIGINAL SOLUTION GAS-OIL RATIO: CUBIC FEET PER BARREL	
AVERAGE POROSITY: PER CENT		ORIGINAL FORMATION VOLUME FACTOR: BARRELS SATURATED OIL PER BARREL STOCK-TANK OIL	
AVERAGE RESIDUAL OIL SATURATION: PER CENT OF PORE SPACE		CALCULATED ORIGINAL STOCK-TANK OIL IN PLACE: BARRELS PER ACRE-FOOT	

Calculated maximum solution gas drive recovery is barrels per acre-foot, assuming production could be continued until reservoir pressure declined to zero psig. Calculated maximum water drive recovery is barrels per acre-foot, assuming full maintenance of original reservoir pressure, 100% areal and vertical coverage, and continuation of production to 100% water cut. *(Please refer to footnotes for further discussion of recovery estimates.)*

(c) Calculated (e) Estimated (m) Measured (*) Refer to attached letter.

These recovery estimates represent theoretical maximum values for solution gas and water drive. They assume that production is started at original reservoir pressure; i.e., no account is taken of production to date or of prior drainage to other areas. The effects of factors tending to reduce actual ultimate recovery, such as economic limits on oil production rates, gas-oil ratios, or water-oil ratios, have not been taken into account. Neither have factors been considered which may result in actual recovery intermediate between solution gas and complete water drive recoveries, such as gas cap expansion, gravity drainage, or partial water drive. Detailed predictions of ultimate oil recovery to specific abandonment conditions may be made in an engineering study in which consideration is given to overall reservoir characteristics and economic factors.

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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-122
Revised 12-1-55

MULTI-POINT BACK PRESSURE TEST FOR GAS WELLS

Pool Wildcat Formation (Penn) Canyon Dol. County Eddy

Initial X Annual ______ Special ______ Date of Test Nov. 18-19, 1962

Company Ralph Lowe Lease Indian Basin Well No. 1 (Upper)

Unit E Sec. 23 Twp. 21S Rge. 23E Purchaser None

Casing 7 Wt. 26.0 I.D. 6.276 Set at 10,180 Perf. 7376 To 7586

Tubing 2 Buttress Wt. 4.60 I.D. 1.995 Set at 7324 Perf. ______ To ______

Gas Pay: From 7376 To 7586 L 7324 xGLix =.788 -GL ______ Bar.Press. 13.2

Producing Thru: Casing ______ Tubing X Type Well Gas-Gas Dual
Single-Bradenhead-G. G. or G.O. Dual

Date of Completion: 10-3-1962 Packer Baker "K" 7324 Baker "D" 7640 Reservoir Temp. 146°F

OBSERVED DATA

Tested Through ~~(Prover)~~ ~~(Choke)~~ (Meter) Type Taps Flange

No.	Flow Data: ~~(Prover)~~ (Line) Size	Flow Data: ~~(Choke)~~ (Orifice) Size	Flow Data: Press. psig	Flow Data: Diff. h_w	Flow Data: Temp. °F.	Tubing Data: Press. psig	Tubing Data: Temp. °F.	Casing Data: Press. psig	Casing Data: Temp. °F.	Duration of Flow Hr.
SI						2375				44
1.	4.026	2.500	530	9.00	64	2150				4
2.	4.026	2.500	530	20.00	64	1915				4
3.	4.026	2.500	510	39.00	67	1597				4
4.	4.026	2.500	520	57.00	70	1225				4
5.										

FLOW CALCULATIONS

No.	Coefficient (24-Hour)	$\sqrt{h_w p_f}$	Pressure psia	Flow Temp. Factor F_t	Gravity Factor F_g	Compress. Factor F_{pv}	Rate of Flow Q-MCFPD @ 15.025 psia
1.	42.13	69.92	543.2	.9962	.9721	1.053	3,004
2.	42.13	104.23	543.2	.9962	.9721	1.053	4,477
3.	42.13	142.84	523.2	.9933	.9721	1.047	6,084
4.	42.[illegible]	174.33	533.2	.9905	.9721	1.048	7,517
5.							

PRESSURE CALCULATIONS

Gas Liquid Hydrocarbon Ratio 35,265 cf/bbl. Specific Gravity Separator Gas .635
Gravity of Liquid Hydrocarbons [illegible] deg. Specific Gravity Flowing Fluid .7351
F_c [illegible] $(1-e^{-s})$ [illegible] P_c 2388.2 P_c^2 5703.3

No.	P_w P_t (psia)	P_t^2	F_cQ	$(F_cQ)^2$	$\frac{(F_cQ)^2}{(1-e^{-s})}$	P_w^2	$P_c^2-P_w^2$	Cal. P_w	$\frac{P_w}{P_c}$
1.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5.									

Absolute Potential: [illegible] MCFPD; n [illegible]
COMPANY [illegible]
ADDRESS [illegible]
AGENT and TITLE [illegible]
WITNESSED
COMPANY

REMARKS

INSTRUCTIONS

This form is to be used for reporting multi-point back pressure tests on gas wells in the State, except those on which special orders are applicable. Three copies of this form and the back pressure curve shall be filed with the Commission at Box 871, Santa Fe.

The log log paper used for plotting the back pressure curve shall be of at least three inch cycles.

NOMENCLATURE

Q = Actual rate of flow at end of flow period at W. H. working pressure (P_w). MCF/da. @ 15.025 psia and 60° F.

P_c = 72 hour wellhead shut-in casing (or tubing) pressure whichever is greater. psia

P_w = Static wellhead working pressure as determined at the end of flow period. (Casing if flowing thru tubing, tubing if flowing thru casing.) psia

P_t = Flowing wellhead pressure (tubing if flowing through tubing, casing if flowing through casing.) psia

P_f = Meter pressure, psia.

h_w = Differential meter pressure, inches water.

F_g = Gravity correction factor.

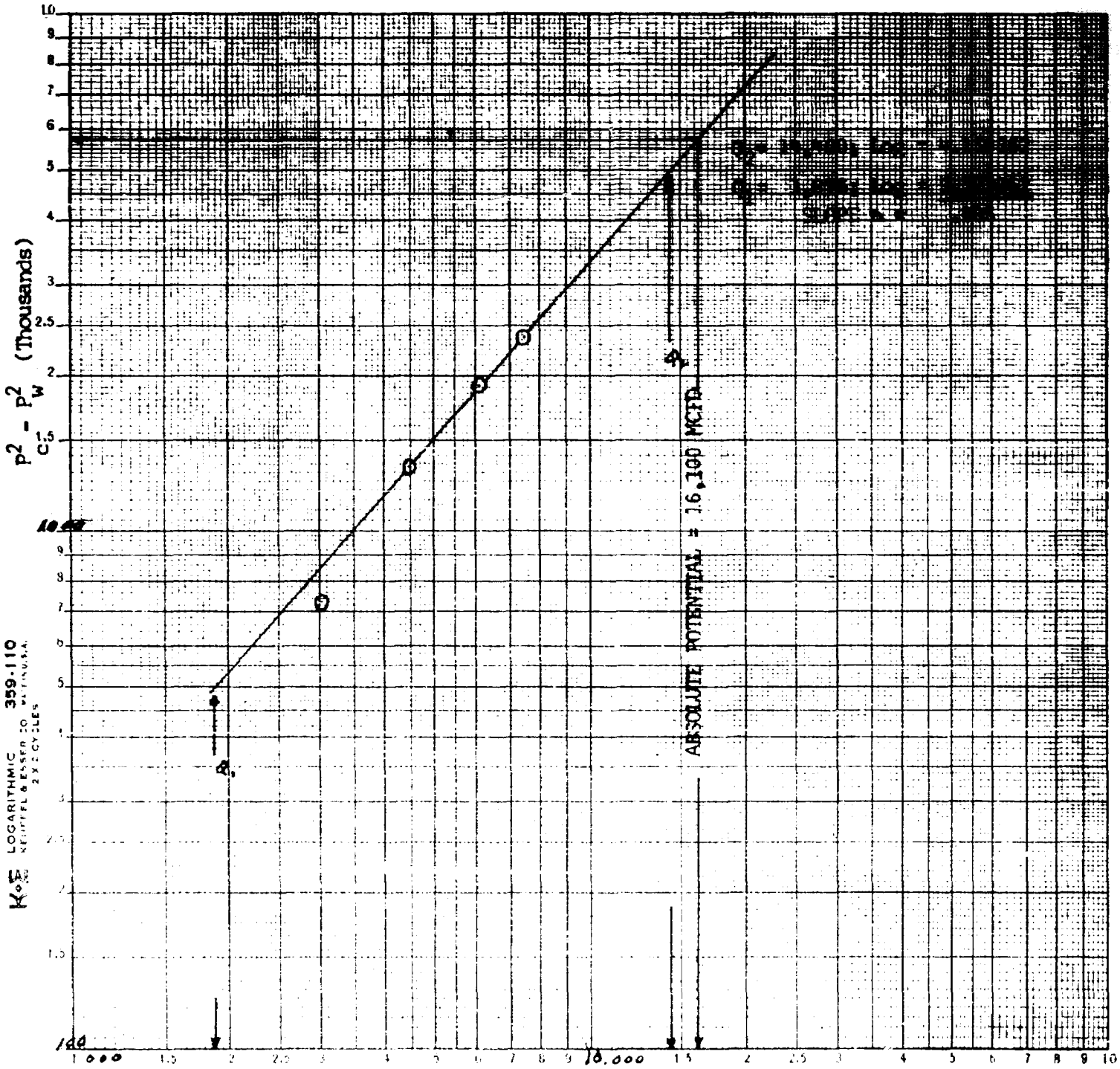
F_t = Flowing temperature correction factor.

F_{pv} = Supercompressability factor.

n = Slope of back pressure curve.

Note: If P_w cannot be taken because of manner of completion or condition of well, then P_w must be calculated by adding the pressure drop due to friction within the flow string to P_t.

COMPANY Ralph Lowe
WELL Indian Basin No. 1 (Upper)
LOCATION E 23 - 21S- 23E
COUNTY Eddy
DATE November 18-19, 1962



Q - MCFD- 15.025 psia

MAIN OFFICE OCC

1963 JAN 21 AM

NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

IN THE MATTER OF THE APPLICATION OF RALPH LOWE FOR THE CREATION OF A NEW GAS POOL IN THE MORROW RESERVOIR, CONSISTING OF SECTIONS 22 AND 23, TOWNSHIP 21 SOUTH, RANGE 23 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO, TO BE KNOWN AS THE INDIAN BASIN GAS POOL, AND FOR THE PROMULGATION OF SPECIAL FIELD RULES THEREFOR INCLUDING PROVISIONS FOR 640 ACRE SPACING AND PRORATION UNITS.	)	NO. 2750

New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Comes the undersigned, Ralph Lowe of Midland, Texas, and hereby makes application for the designation of a new gas pool for the Morrow reservoir, found at a depth of approximately 9,000 feet below the surface in Sections 22 and 23, Township 21 South, Range 23 East, N.M.P.M., Eddy County, New Mexico, to be known as the Indian Basin Morrow Gas Pool, and for the promulgation of special field rules therefor, including a provision for 640 acre spacing and proration units, and respectfully requests that an Examiner's Hearing be held thereon after publication of notice, as provided by the rules and regulations of the Oil Conservation Commission.

Respectfully submitted,

RALPH LOWE

By _____

HERVEY, DOW & HINKLE

By _____
P.O. Box 10
Roswell, New Mexico
Attorneys forRalph Lowe

DOCKET MAILED

Date 1-23-63

DOCKET MAILED

Date 1/23/63

ATWOOD & MALONE
LAWYERS

P. O. DRAWER 700
TELEPHONE 505 622-6221
SECURITY NATIONAL BANK BUILDING
ROSWELL, NEW MEXICO
88201

JEFF D. ATWOOD (1883-1960)
ROSS L. MALONE
CHARLES F. MALONE
RUSSELL D. MANN
PAUL A. COOTER
BOB F. TURNER
ROBERT A. JOHNSON
JOHN W. BASSETT, JR.

FEBRUARY
3rd
1967

Mr. A. L. Porter, Jr.
Secretary
New Mexico Oil Conservation Commission
Post Office Box 871
Santa Fe, New Mexico

Re: Cases Nos. 2749 and 2750 (Reopened)

Dear Mr. Porter:

We enclose herewith our Entry of Appearance in the two above captioned cases on behalf of Marathon Oil Company on the Examiner's docket for February 8, 1967, with the request that you please file same.

Thank you.

Very truly yours,

Ross L. Malone
for ATWOOD & MALONE

R
L
M

*

v
Encls.

Cc: J. O. Terrell Couch, Esquire

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 No. 2750
Order No. R-2441
NOMENCLATURE

APPLICATION OF RALPH LOWE
TO CREATE A NEW POOL FOR
MORROW GAS PRODUCTION AND
FOR SPECIAL POOL RULES,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on February 6, 1963, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 28th day of February, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Ralph Lowe, seeks the creation of a new gas pool for Morrow production and the promulgation of temporary special rules and regulations governing said pool, including a provision for 640-acre spacing units.

(3) That a new gas pool for Morrow production should be created and designated the Indian Basin-Morrow Gas Pool. This pool was discovered by the Ralph Lowe Indian Basin Well No. 1, located in Unit E of Section 23, Township 21 South, Range 23 East, NMPM, Eddy County, New Mexico. The top of the perforations in the Morrow formation is at 9039 feet.

(4) That temporary special rules and regulations establishing 640-acre spacing units should be promulgated for the subject pool in order to prevent the possibility of economic loss resulting from the drilling of unnecessary wells and in order to allow

the operators in the subject pool to gather information concerning the reservoir characteristics of the pool.

(5) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(6) That special rules and regulations should be established for a temporary period to expire one year from the date that a pipeline connection is first obtained for a well in the pool; that during this temporary period all operators in the subject pool should gather all available information relative to drainage and recoverable reserves.

(7) That this case should be reopened at an examiner hearing one year from the date that a pipeline connection is first obtained for a well in the Indian Basin-Morrow Gas Pool, at which time the operators in the subject pool should appear and show cause why the Indian Basin-Morrow Gas Pool should not be developed on 160-acre spacing units.

(8) That the first operator to obtain a pipeline connection for a well in the Indian Basin-Morrow Gas Pool should notify the Commission in writing of such fact, and that the Commission should thereupon issue a supplemental order designating an exact date for reopening this case.

IT IS THEREFORE ORDERED:

(1) That a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production is hereby created and designated the Indian Basin-Morrow Gas Pool, consisting of the following-described area:

TOWNSHIP 21 SOUTH, RANGE 23 EAST, NMPM
Section 22: All
Section 23: All

(2) That Special Rules and Regulations for the Indian Basin-Morrow Gas Pool are hereby promulgated as follows, effective March 1, 1963.

SPECIAL RULES AND REGULATIONS
FOR THE
INDIAN BASIN-MORROW GAS POOL

RULE 1. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool or in the Morrow formation within one mile of the Indian Basin-Morrow Gas Pool, and not nearer to or within the limits of another designated Morrow pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool shall be located on a standard unit containing 640 acres, more or less, consisting of a single governmental section.

RULE 3. The Secretary-Director may grant an exception to the requirements of Rule 2 without notice and hearing when an application has been filed for a non-standard unit and the unorthodox size or shape of the unit is necessitated by a variation in the legal subdivision of the United States Public Lands Survey, or the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of quarter-quarter sections or lots that are contiguous by a common bordering side.

(b) The non-standard unit lies wholly within a single governmental section and contains less acreage than a standard unit.

(c) The applicant presents written consent in the form of waivers from all offset operators and from all operators owning interests in the section in which the non-standard unit is situated and which acreage is not included in said non-standard unit.

(d) In lieu of Paragraph (c) of this rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if no such operator has entered an objection to the formation of such non-standard unit within 30 days after the Secretary-Director has received the application.

RULE 4. Each well completed or recompleted in the Indian Basin-Morrow Gas Pool shall be located no nearer than 1650 feet to the outer boundary of the section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 5. The Secretary-Director may grant an exception to the requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may

approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application.

IT IS FURTHER ORDERED:

(1) That any well presently drilling to or completed in the Morrow formation within the Indian Basin-Morrow Gas Pool or within one mile of the Indian Basin-Morrow Gas Pool that will not comply with the well location requirements of Rule 4 is hereby granted an exception to the requirements of Rule 4. The operator of any such well shall notify the Artesia District Office in writing of the name and location of the well on or before March 1, 1963.

(2) That any operator desiring to dedicate 640 acres to a well presently drilling to or completed in the Indian Basin-Morrow Gas Pool shall file a new Form C-128 with the Commission on or before March 1, 1963.

(3) That this case shall be reopened at an examiner hearing one year from the date that a pipeline connection is first obtained for a well in the Indian Basin-Morrow Gas Pool, at which time the operators in the subject pool may appear and show cause why the Indian Basin-Morrow Gas Pool should not be developed on 160-acre spacing units.

(4) That the first operator to obtain a pipeline connection for a well in the Indian Basin-Morrow Gas Pool shall notify the Commission in writing of such fact, and that the Commission will thereupon issue a supplemental order designating an exact date for reopening this case.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M Campbell
JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary

esr/

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 6, 1963

IN THE MATTER OF:

Application of Ralph Lowe to create a new pool for Upper Pennsylvanian gas production, and for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Upper Pennsylvanian gas production in Sections 22 and 23, Township 21 South, Range 23 East, and the establishment of temporary pool rules therefor, including a provision for 640-acre spacing units. CASE 2749

IN THE MATTER OF:

Application of Ralph Lowe to create a new pool for Morrow gas production, and for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Morrow production in Sections 22 and 23, Township 21 South, Range 23 East, and the establishment of temporary pool rules therefor, including a provision for 640-acre spacing units. CASE 2750

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call next Case 2749.

MR. DURRETT: Application of Ralph Lowe to create a new pool for Upper Pennsylvanian gas production, and for special pool rules, Eddy County, New Mexico.

MR. BRATTON: Howard Bratton, appearing on behalf of the Applicant. If we could, we would like to present this case and 2750 together.

MR. NUTTER: We'll call next Case 2750.

MR. DURRETT: Application of Ralph Lowe to create a new pool for Morrow gas production, and for special pool rules, Eddy County, New Mexico.

MR. NUTTER: Is there objection to the consolidation of Cases 2749 and 2750 for the purpose of taking the testimony? The cases will be consolidated.

MR. BRATTON: If the Commission please, I am a little embarrassed, Mr. Stamets asked me if I had an extra copy of the exhibits that he could take back with him. Unfortunately, we came with only one copy of the exhibits, and I am going to ask if the witness and the Examiner can sit in close proximity so we can see what we're talking about. We will furnish extra copies, including one for Mr. Stamets.

(Witness sworn.)

(Whereupon, Applicant's Exhibits Nos. 1 through 10 marked for identification.)

HARVIN L. LANDUA

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name and by whom you are employed and in what capacity?

A Harvin L. Landua, employed by Ralph Lowe as a Technical

Administrator.

Q Have you previously testified before this Commission as an expert witness, Mr. Landua?

A Yes, I have.

Q Are you familiar with the area in question in these two cases?

A Yes, sir.

MR. BRATTON: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir, they are.

Q (By Mr. Bratton) Mr. Landua, as I understand, these two cases involve the same area and they involve two pools overlying each other, is that correct?

A That's correct.

Q And you will present the evidence relating to each of the two pools, the designation of them and the proposed field rules?

A Yes, sir.

Q Will you refer to your Exhibit No. 1, Mr. Landua, and explain what that is and what it shows?

A Exhibit No. 1 is a plat showing the location of the two completed wells and the current drilling well in this area, which has been designated the Indian Basin Area. It's located in 21 South, 23 East, of Eddy County, New Mexico.

Q What two sections are we talking about, Mr. Landua?

A We have asked that Sections 22 and 23 be included in

the current designation of this pool.

Q Now the first well drilled was located in Section 23?

A 23.

Q And the second well drilled was located in Section 22?

A Correct.

Q And both wells encountered both pools, is that correct?

A That's correct.

Q Now there's a third well drilling at the moment where, Mr. Landua?

A In Section 14, being located 1650 from the south and east lines of Section 14, and this morning the well is drilling at 8460.

Q But for the moment we're just talking about the two sections in which the two completed wells are located?

A Yes, sir.

Q Now, Mr. Landua, do you have a geological structure map or any such of this area?

A No, sir.

Q Would you explain very briefly to the Commission why not?

A We have not prepared our geological structure map because we cannot explain this accumulation of gas. The original well was drilled on geophysics and the geophysics indicated that we had a Devonian structure. The Devonian proved water-bearing, and the Pennsylvanian gas shows were encountered up the hole. We

do not know whether they will be related to structure or stratigraphic condition at this time.

Q It's just too early and incomplete information upon which you could hazard a guess that you would want the Commission to rely upon?

A That's correct. We have no idea which way the pool will tend to go.

Q Do you have anything further in connection with your Exhibit No. 1?

A I think the Exhibit would be self-explanatory. It shows the operators and the wells.

Q The first two wells are both operated by Ralph Lowe?

A That's correct.

Q Let's turn then to your Exhibit No. 2, Mr. Landua.

A Exhibit 2 is a Schlumberger electrical well log that was taken in the first well, and the log has been marked as to top of the various formations encountered. It further shows the interval open to production in each of these two intervals and is defined as a dual induction lateral log.

Q Let's get down to the two formations we're talking about now, Mr. Landua. The first pool, the first formation is the Upper Pennsylvanian, is that correct?

A That's correct. We have designated it as the Upper Pennsylvanian section and the section extends roughly from 7354 to 8,054 in this well, as depicted on this log.

Q Now you have the tops and bottoms of the various formations drawn on that exhibit, is that correct?

A That's correct.

Q And also the interval open in this well, is that correct?

A To production, that's correct.

Q Now go on down the log to the Morrow formation.

A In this particular well, the Morrow formation was encountered from 8945 to 9442.

Q And you have the top and bottom marked on there, as well as the interval open in the well, is that correct?

A That's correct.

Q Do you have these two formations dualled in this well, is that correct?

A Yes, sir, they're dualled with two strings of tubing.

Q Is there anything else you care to bring out in connection with the log of that well?

A Nothing other than that our gas was encountered within the Pennsylvanian section.

Q Turn to your next exhibit, is that a log of the second well in Section 22?

A Yes, Exhibit 3 is an identical log that was run in the second well, and the formation tops were marked and designated just as in the other exhibit; and the interval open to production was indicated in the same manner.

Q Now the two formations encountered there, can you

correspond them to the formations encountered in Well No. 1?

A Yes.

Q You picked up the same two formations and you can correlate them from one log to the other?

A Yes, sir.

Q And you have, and those are marked on the log?

A Yes, sir.

Q What are the intervals on those as to the two formations on that log?

A In the second well, the Upper Pennsylvanian was encountered from 7353 to 8,034. The Morrow was encountered from 8954 to 9418. The second well, incidentally, was not taken to the Devonian.

Q From those logs or from your other information, is there communication between these two pools, these two accumulations?

A Horizontal communication.

Q Yes.

A They are separated by shales, sands, limestones, definite separation.

Q Turn then to your next Exhibit 4, and they are identical, Mr. Landua, only as to the different formations in the wells?

A Yes. They are a Form C-122, New Mexico Oil Conservation Commission, Multi-point Back Pressure Test for Gas Wells. These forms indicate the results of the absolute open flow test taken

on both wells in each zone. They were taken in the presence of the Commission's engineers by consulting engineers, and were taken under the recommended procedures of good production practices of testing.

Q What do they reflect as to the potential of each pool in the two wells?

A In the first well, the Upper Penn section had a calculated absolute open flow potential of 16,100,000 cubic feet of gas per day, along with approximately 13 barrels per million of 61 gravity condensate.

Q Then as to the others, Mr. Landua?

A The Morrow formation -- incidentally, this is Exhibit 4. Exhibit 5 is an absolute open flow test of the Morrow formation in the No. 1 well, and that absolute open flow potential was 12,100,000 cubic feet per day along with approximately three barrels per million of 53 gravity condensate.

We have also indicated on these forms exact productive interval open, which is shown on the logs. I present this as Exhibit 5.

Exhibit 6 is the absolute open flow test for the Upper Pennsylvanian in the second well, and it reflects an absolute open flow potential of 14,250,000 cubic feet of gas per day along with condensate in approximately the same ratio.

MR. NUTTER: As the No. 1?

A As the No. 1 Upper. Exhibit 7 is a test of the Morrow

in the second well, and this test resulted in obtaining 20 million cubic feet of gas per day along with condensate in approximately the same ratio as in the first well.

MR. NUTTER: In the lower?

A In the lower. That's Exhibit 7.

Q (By Mr. Bratton) Now turn to your Exhibit No. 8, Mr. Landua.

A Exhibit 8 is a tabulation of core data of the cores that were taken in the first well. In this well, short intervals were cored primarily to get a look at the formation.

Q Actually, Mr. Landua, you cored extensively in the No. 2 Well, didn't you?

A Yes.

Q In this first well, how much did you core?

A In the first well, in the Upper Pennsylvanian we cored 25 feet and had 14.4 analyzed.

Q And in the lower you cored --

A In the lower?

Q No, in the first well.

A In the lower we cored 4.5 feet and had 4.5 feet analyzed.

Q Now the results of that analysis are shown in that exhibit?

A Yes.

Q And they reflect a lower range of permeability than in

your No. 2 where you cored great portions of the intervals, is that correct?

A That's correct.

Q Let's turn to your Exhibit Number -- your next exhibit on the Well No. 2.

A That's Exhibit 9, which has the core data put up in similar fashion.

Q How much did you core in the Upper Penn in that No. 2 Well?

A In the Upper Penn in the second well we cored 273.9 feet.

Q What are the indicated results of that as to permeability and porosity and the other information reflected there?

A The permeability and porosity is much higher as an over-all average where we got more of the formation to look at. Out of the 273.9 feet, we had 181.4 analyzed.

Q What were the results of that, Mr. Landua?

A These results indicate that the average permeability for the 181.4 feet analyzed was 44 millidarcys, and the average porosity was 3.7 percent.

Q What else is reflected there? Is water reflected there?

A Yes, residual water saturations and the residual oil saturations are also reflected.

Q What are those?

A The connate water was 35.4 percent of the pore space,

and the oil saturation was 4.8 percent of the pore space.

Q Go then to the Morrow formation, and what did you core of it and what were the results of that?

A In the Morrow formation, 187.9 feet were cored, and 18.0 feet were analyzed.

Q What were your results?

A The permeability is reflected here as 12 millidarcys for this 18 feet. The average porosity is 10.8 percent. The residual oil saturation is 3.9 percent, average connate water saturation, 48.5 percent.

Q These wells are shut-in, of course?

A Yes.

Q Is there any pipeline anywhere within the general area?

A Yes.

Q How close?

A We understand approximately 40 miles.

Q Is it liable to be quite a while before there is any production from this area?

A Yes.

Q In the terms of months or years?

A Personally, we think years.

Q Actually, you are a good long way removed at the moment?

A Yes, sir.

Q Do you have any other information upon which at this time effectiveness of drainage could be estimated, other than the

productivity and the data from the cores?

A None.

Q Based on those data, what is your estimate, Mr. Landua, as to the drainage area of one well in each of these two pools?

A I would say, based on the material encountered in the well bore in these two wells in each of these formations, they would be capable of a drainage area in excess of 640 acres.

Q Until such time as you have some production history and the possibility of interference tests, would it be possible to make any other or different estimate of the area, Mr. Landua?

A No, sir.

Q So that at the present time, and based on the present information available, you think a well in each of these pools will drain in excess of 640 acres?

A Yes, sir.

Q Turn to your next exhibit, then, Mr. Landua.

A The tenth exhibit is a tabulation of the cost of the first well and the cost of the second well.

Q What do those reflect as to cost, Mr. Landua?

A The first well, which was taken to the Devonian at approximately 10,100 feet, cost $431,419.83.

Q And the second well?

A The second well, which was taken just to the Barnett shale at approximately 9500, cost $296,122.04.

Q Now that second well, Mr. Landua, would that be more

approximately the cost of future wells in these two pools?

A Future dually completed wells, yes.

Q The first well went to the Devonian and also had considerably more testing?

A Yes.

Q Mr. Landua, do you or any of the operators in this area have any estimate as to possible recovery, based on the limited data that you have at this time?

A Yes.

Q What is that, Mr. Landua?

A One operator has estimated that the two zones together in the first well could have between ten and fourteen billion cubic feet of gas reserves to the gross well.

Q Computing gas and liquids, what would be the approximate recovery, dollar-wise, on a 640-acre spacing in this area, Mr. Landua?

A This same operator has estimated that his return on money would be somewhere between three and five to one on 640-acre spacing.

Q I hate to inject an unhappy note into the proceedings, Mr. Landua, but that is based on a gas price considerably in excess of what the F.P.C. or Examiners seem to be talking about at this point, isn't that correct?

A Yes, sir. If we used a nine cent price in our economic work, it would cut this return approximately by three-eighths, I

guess.

Q It would be somewhere down between one and two to one?

A One and three to one, yes.

Q That's the price that apparently the F.P.C. is talking about at the moment?

A That's what I understand, yes, sir.

Q Mr. Landua, is there anything else you care to say in connection with any of these exhibits before we discuss the rules that you would propose to the Commission?

A Mr. Bratton, I believe I would like to point out that the Upper Pennsylvanian in these wells is an intercrystalline dolomite, has large vugs and large fractures; and as we said previously, would have considerable drainage area. We don't believe that our core information would reflect the best part of our formation characteristics.

Q In your opinion, based on the present information, one well will drain in excess of 640 acres in each of these two pools?

A Yes, sir.

Q And the two pools are two separate accumulations, two separate reservoirs, in your estimation?

A Yes, sir.

Q There's no interconnection vertically between them?

A That's correct.

Q What rules would you suggest to the Commission for each of these two pools?

A We would suggest the following rules: First, temporary field rules be granted for a period of twelve months from the date issued.

Q That would be with the firm understanding that very possibly in twelve months we may not have very much more information than we have now because we may, probably, not have a pipeline in there?

A That's correct.

Q But we may have additional information from additional wells drilled?

A Yes, sir.

Q What would your second rule be?

A The second request that we have is that spacing units of 640 acres be set up, and all these acres be within a legal section.

Q Your third rule?

A The third rule, future wells should be placed at least 1650 feet from spacing unit lines.

Q I believe two of these wells are a little closer to the section line than that, is that correct?

A That's correct.

Q And the third well is within that limitation?

A Yes.

Q And you would suggest for some reasonable uniformity of pattern that 1650 be established for future wells?

A Yes, sir.

Q What is your fourth rule?

A The fourth rule then is that the two currently completed wells and the one now drilling be excluded from the spacing requirements of our third rule. Actually, the second well is spaced all right, and the third well, the one currently drilling, is all right. The discovery well was 660 from the section line.

Q But the other two wells would meet the 1650?

A They would meet the pattern, but for the sake of uniformity --

Q Then otherwise you would suggest the Statewide rules, is that correct?

A The component that we would like to request is that all other rules be as the current Statewide rules.

Q Is there anything further you care to state in connection with this application, Mr. Landua?

A No, sir, I have nothing further.

Q Let's go back to one thing. What would you suggest by way of vertical delineations of the two pools?

A I would suggest a depth delineation to cover the interval as marked on electric log of the first well.

Q And those corresponding intervals, whatever depth found in future wells?

A Yes, sir.

Q And I believe you've testified as to those two intervals

in connection with the first well?

A Yes, sir.

Q Were Exhibits 1 through 10 prepared by you or under your supervision?

A Yes, sir.

Q And can we, within a few days, supply to the Commission additional copies of all of these exhibits?

A Yes, sir.

MR. BRATTON: We would offer in evidence Exhibits 1 through 10.

MR. NUTTER: Ralph Lowe's Exhibits 1 through 10 will be admitted in evidence.

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

MR. BRATTON: I have nothing further at this time.

MR. NUTTER: Does anyone have any questions of Mr. Landua?

CROSS EXAMINATION

BY MR. NUTTER:

Q What is the name designation commonly used by the geologist for the upper section in these wells?

A Cisco.

Q That's the Cisco. You gave the gross interval of the Cisco and the Morrow in each of those wells. What is the actual perforated interval?

A In the first well, the actual perforated interval open to production in the upper is 7376 to 7538, and 7560 to 7588. The lower, the Morrow, in the first well, 9,039 to 9,049, 9,199 - 9,207, 9,227 - 9,235, 9,238 - 9,246, 9,251 - 9,263. Would you like to have the second well?

Q Yes, sir, please.

A In the upper in the second well, 7505 - 7517, 7524 - 7533, 7539 - 7572. In the Morrow, the lower, 9,118 - 9,130, 9,252 - 9,266.

Q In the No. 1 upper, we have two perforated sections in the gross interval, and in the No. 1-A upper we have three perforated sections. Is one zone of porosity non-correlative from one well to the other?

A No, sir. I would say that they are correlative.

Q And that one of these that was perforated is, the third section in the No. 1-A, is included in the gross perforated interval of the No. 1?

A That's correct.

Q Well, then, you have five perforated sections in the Morrow in the No. 1 and only two in the No. 1-A. What's the reason for that?

A The reason for that would be that in the 1-A, we had one sand section that looked real good and in the first well we had a sand section but it was over an interval, over a wider interval.

Q The pay is actually thinning out as you go from the No. 1 to the No. 1-A in the Morrow, isn't it? You have a gross perforated interval in the No. 1 from 9,039 to 9,263, which would be approximately 220 feet; and the other well, you have about 150 feet of pay?

A Yes, we do. We chose not to perforate all the sand intervals in the second well because the one sand we had looked so good that we thought it would provide adequate drainage.

Q But there was additional pay there that was not perforated?

A That's correct.

Q You gave us the average permeability and porosity in the No. 1-A. I realize you had a much greater core there. What was the indicated porosity and permeability in the core of the No. 1?

A In the upper, the 14.4 feet that was analyzed, the permeability was six-tenths of a millidarcy. The porosity was 5.0 percent. The residual oil saturation was 1.4 percent and the water saturation is 48.7 percent; and the interval cored was 7610 to 7635, which is well down in the dolomite section relatively near the gas-water contact.

Q That's low down in the upper pay, then?

A Yes, sir. In the Morrow, the interval cored was from 9200 to 9204.5. The average reported permeability, 2.5 millidarcys; average porosity, 6.6 percent; residual oil saturation,

2.2 percent; water saturation, 19.3 percent.

Q Now referring back to the Upper Pennsylvanian in this No. 1 core, you got a permeability of six-tenths millidarcys. You said this was in the lower section of the Upper Penn?

A Correct.

Q Now the Upper Penn in the other well reflected an average permeability of 44 millidarcys, that was for the entire 181 feet that was analyzed. Was the permeability low in the section that corresponds to the section that was cored in the No. 1-A well?

A We have not studied that, but I think maybe we can read off here. I don't have the exact correlation.

Q Well, at approximately 7600 feet in the No. 1-A well, what was the permeability?

A Well, I have it from 7600 to 7610; at approximately 7600 here is a permeability reading, 7600.2 to 7601.8, permeability is 13 millidarcys and the porosity is 3.8 percent.

Q Then say at about 7620, what would it be?

A Here is one from 7620.4 to 7621.5. It's .5 of a millidarcy, and the porosity is 3.9 percent.

Q So that's getting down in the same range that you obtained in the core of the No. 1 well?

A Yes, sir.

Q What about pressures, Mr. Landua?

A The pressure in the dolomite section is approximately

2900 pounds.

Q Is that the same in both wells?

A Yes, sir, which we assume would be normal for that depth. I don't have the exact figures, but that's the range. In the Morrow it's approximately 3600 pounds.

Q Is it the same in both wells, approximately?

A Approximately, yes; the pressures seem normal for depth.

Q You said that one of the pipelines was about 40 miles from here. What pipeline would that be?

A I understand that Transwestern and Southern Union have pipelines in the area within approximately the same distance.

Q They are both about the same distance?

A Yes, sir. We have not made a map study to determine the location of those lines.

Q Have you commenced any negotiations with either purchaser of gas at the present time?

A No, sir. Our intention is to see what sort of an area we have so that we can indicate to people approximately the magnitude of the reserves that we might have for them.

Q What's the distance to the nearest El Paso line?

A I don't know.

Q What's the estimated cost of the No. 3 Well?

A $295,000.00.

Q Now the No. 3 Well, you said, was drilling at 8460;

that would be sufficient depth to penetrate the Upper Pennsylvanian. Was a drillstem test taken in the Upper Pennsylvanian?

A We got approximately 800,000 cubic feet of gas per day from the top 79 feet. We think we have roughly 400 feet of dolomite in this well, and it was encountered approximately 90 feet low to the second well in the area.

Q Now the dolomite was encountered at approximately the same depth in the No. 1 and the 1-A, so it would be about 90 feet low to the one, also?

A Actually, the dolomite was about 30 feet higher in the 1-A than in the first well.

Q So this would make the No. 1-B run about 60 feet lower than the No. 1, then?

A That's correct. We don't know if those are structural markers, but that was the exact location of the dolomite as we can identify in all three wells.

Q And the well isn't deep enough to have encountered the Morrow, is it?

A No, sir.

MR. NUTTER: Are there any other questions of Mr. Landua?

MR. DURRETT: Yes, I have a question.

MR. NUTTER: Mr. Durrett.

BY MR. DURRETT:

Q Mr. Landua, I'm referring to your proposed rules. If the Commission should determine that a more rigid spacing requirement

in this pool or these pools might be desirable, would you have any objection to this, as long as wells that are presently completed or drilling are granted an exception?

A No, sir, I have none.

Q You think that this might possibly be reasonable, to require more rigid spacing of wells in order to protect correlative rights?

A What do you mean by "rigid"? You mean greater distance from lease lines?

Q Greater distance from lease lines or located in a specific quarter section.

A We have it located in the specific quarter section now.

Q I mean all wells drilled would be located in, for example, the Northwest Quarter or the Southeast Quarter of a governmental section?

A Yes.

Q Was that your proposal?

A No, my proposal was 1650 from lease lines and leave it at the discretion of the operator as to what quarter section he located his well in.

Q You wouldn't feel it would be unnecessarily unreasonable if the Commission required that they be drilled in specific quarter sections, as long as all the wells that are presently completed are granted an exception?

A In this type of reservoir, where we have no idea, the

reason for the accumulation, if it would be related to structure then we might be able to say that we wouldn't mind having wells in the specific quarter section. I think perhaps we should have a little more leeway here in the choosing of the location of these wells.

Q Well, according to, or going along with you on that line, would it be objectionable then to have them located in the specific half section or alternative half sections?

A No, sir, I don't think it would be.

MR. NUTTER: What you have proposed here, Mr. Landua, is by using the 1650 feet from the outer boundary of the section --

A Yes, sir.

MR. NUTTER: You have proposed in effect that the well must be located within the interior 4 - 40-acre tracts?

A Yes. We don't mind getting 1980; we want to say at least 1650.

MR. PORTER: This would be a minimum?

A Minimum, yes, sir.

MR. DURRETT: That will do it, yes, sir.

MR. NUTTER: Any other questions of Mr. Landua? Do you have anything further, Mr. Bratton?

MR. BRATTON: No, sir.

MR. NUTTER: Does anyone have anything further to offer in Cases 2749, 2750 consolidated?

MR. DURRETT: Yes, sir. The Commission has received

correspondence concerning this matter. I would like to read it into the record at this time. The first is a letter from Union Oil Company of California and reads as follows:

"Re Cases No. 2749 and 2750. Gentlemen: In the above-numbered cases set for hearing February 6, 1963, Ralph Lowe seeks special pool rules and new pool designations for Upper Pennsylvanian and Morrow gas production in Sections 22, 23, Township 21 South, Range 23 East, Eddy County, New Mexico. Union Oil Company of California, as leaseholder of neighboring acreage, strongly supports the proposed temporary field rules. We feel that the proposed provision for 640-acre spacing units is in the interest of conservation, and respectfully urge the Commission's favorable consideration of this provision." Signed, R. S. Cook, Division Engineer.

The Commission has received a telegram from B. G. Taylor, Kerr-McGee Oil Company. I would like to read it at this time. It reads: "Re Cases 2749, 2750, scheduled for hearing on February 6, 1963. As a working interest owner in Sections 22 and 23, Township 21 South, Range 24 East, Eddy County, New Mexico, Kerr-McGee Oil Industries, Inc. concurs in applications by Ralph Lowe for the creation of new pools and establishment of temporary pool rules including 640-acre spacing units for Upper Pennsylvanian and Morrow gas production, and that future wells not be drilled nearer than 1650 feet from the outer boundary of 640-acres spaced unit." That is designated as signed by B. G. Taylor for Kerr-

McGee Oil Industries.

We have a final communication in the form of a telegram from Marathon Oil Company, and it reads as follows: "Re Cases 2749 and 2750, Marathon Oil Company joins in the request of Ralph Lowe that temporary rules be adopted for the Upper Pennsylvanian and Lower Pennsylvanian gas pools encountered in Ralph Lowe's Federal Well No. 1 in Section 22, Township 21 South, Range 23 East, Eddy County, New Mexico. However, Marathon recommends the following variations. Number One, the 640-acre proration unit should be substantially in the form of a square comprised of any contiguous governmental quarter sections or lots, not necessarily within the same governmental section but with the usual acreage tolerance; and two, the well for each proration unit should be located at least 1650 feet from the nearest boundary of the proration unit with exception to the 1650-foot requirement for wells completed or currently being drilled, and such other exceptions after hearing as are necessary to protect correlative rights." Marathon Oil Company, by J. O. Terrell Couch.

MR. NUTTER: Does anyone have anything further they wish to offer in this case?

MR. BRATTON: I would like to say we appreciate your share and share alike policy with our exhibits.

MR. NUTTER: I understand the proposal is to name them Indian Basin-Upper Pennsylvanian and Indian Basin-Morrow, is that correct?

MR. BRATTON: Yes.

MR. NUTTER: If there's nothing further in Cases 2749 and 2750, we will take the cases under advisement and take a fifteen-minute recess.

(Whereupon, a short recess was taken.)

* * *

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 8th day of February, 1963.

NOTARY PUBLIC

My Commission Expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2749-2750 heard by me on 2/6, 1963.

..... Examiner
New Mexico Oil Conservation Commission