

dearnley, meier & associates

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
OIL CONSERVATION COMMISSION CONFERENCE ROOM
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
Wednesday, July 11, 1973

IN THE MATTER OF:)
)
In the matter of Case)
No. 4749 being reopened)
pursuant to the provisions)
of Order No. R-4338, which)
order established special)
rules and regulations for the)
Humble City-Strawn Pool, Lea)
County, New Mexico, including)
a provision for 80-acre proration)
units.)
)
)

Case No. 4749

BEFORE: Daniel S. Nutter
Examiner

TRANSCRIPT OF HEARING

1 MR. NUTTER: We will now resume with Case Number
2 4749.

3 MR. CARR: Case 4749, in the matter of Case No. 4749
4 being reopened pursuant to the provisions of Order No.
5 R-4338, which order established special rules and
6 regulations for the Humble City-Strawn Pool, Lea County,
7 New Mexico, including a provision for 80-acre proration
8 units.

9 MR. HINKLE: Clarence Hinkle, Hinkle, Bondurant,
10 Cox & Eaton, Roswell, appearing on behalf of Harding Oil
11 Company. We have one witness and 7 exhibits. We would
12 like to have the witness sworn.

13 ROY WILLIAMSON,
14 was called as a witness, and after being duly sworn according
15 to law, testified as follows:

16 MR. HINKLE: Here is a copy of the exhibits.

17 DIRECT EXAMINATION

18 BY MR. HINKLE:

19 Q State your name and residence.

20 A I'm Roy Williamson. I live in Midland, Texas.

21 Q You are a petroleum engineer?

22 A Yes, I am.

23 Q Are you a member of an engineering firm in Midland?

24 A Yes. I am President of Sipes, Williamson, Runyan &
25 Aycock, Inc.

1 Q Have you previously testified in this case in the Hearing
2 which was held over a year ago?

3 A Yes, I did.

4 Q You were the principle witness at that time?

5 A That is correct.

6 Q Have you made a study of the area which is involved
7 recently to bring all the information up to date?

8 A Yes, I have.

9 Q Are your qualifications as a petroleum engineer a matter
10 of record with this Commission?

11 A Yes, they are.

12 MR. HINKLE: Are the qualifications acceptable?

13 MR. NUTTER: Yes, sir. They are.

14 Q Have you prepared or has there been prepared under your
15 direction certain exhibits for introduction in this case?

16 A Yes.

17 Q Refer to Exhibit Number 1 and explain what this is and
18 what it shows.

19 A Exhibit Number 1 is a structure map on the top of the
20 Strawn pay in the Humble City-Strawn Pool in Lea County,
21 New Mexico. Shown on this map are not only the Strawn
22 completions but other completions from other zones in the
23 area.

24 I'll point out that the circles colored in green are
25 the Strawn completions. In orange are the Atoka

1 completions. The blue is the Yeso Bank completion and
2 the red is a Wolfcamp completion.

3 These are shown mainly for a matter of information
4 although this Hearing is concerned only with the Strawn
5 formation. I might also point out that the ownership map
6 or it's now shown as Mesa was Pupco a year ago; and through
7 a merger Mesa has acquired the Pupco interest in this
8 area.

9 Q Now, the previous rules were adopted for the Humble
10 City-Strawn Pool and only covered the Strawn; is that
11 right?

12 A That's correct.

13 Q Now, what wells have been completed since the original
14 hearing?

15 A Well, in the Section 11, the Harding Oil Company Shipp
16 Number 1, of course, was the discovery well in this field.
17 And the Mesa Shipp Number 2 was drilled at that time and
18 North of the Shipp Number 1, the Shipp Number 3 which
19 was a dry hole since that time in the Southeast.

20 MR. NUTTER: What formations did that well touch,
21 Mr. Williamson?

22 THE WITNESS: Number 3?

23 MR. NUTTER: Yes, sir.

24 THE WITNESS: It tested the Strawn.

25 MR. NUTTER: Did it test any of these other formations

1 also?

2 THE WITNESS: They did not test them, no. They were
3 not productive. Harding drilled the Shipp Number 4 which
4 is in the Southeast portion of Section 11, and it was
5 not productive in the Strawn but was productive in the
6 Atoka. Tipco in the Southwest quarter of Section 12
7 drilled a Byers Number 1 which was completed as an Atoka
8 well.

9 Back to the West in Section 10, Tipco drilled a
10 Nicholson Number 1 Well, completed it in the Yeso. Harding
11 then drilled the Number 5 Well which is a Strawn well.

12 Going on back to the East, Mesa drilled the Number 4
13 which is a Wolfcamp well. Only recently North of the
14 Tipco Nicholson Number 1, Harding drilled a dry hole on
15 the Number 6. The Strawn there was nonproductive as were
16 the other zones.

17 And then below Tipco Number 1 is the Tipco Nicholson
18 Number 2 which is currently completing in the Strawn to
19 the best of my information. I have no completion data
20 at this time.

21 Q (By Mr. Hinkle) That has just recently been completed?

22 A Right, very recently. I don't think it has been
23 potentialled. At least, I have no information indicating
24 that it has.

25 Q Now, refer to Exhibit 2 and explain what it shows.

1 A Okay. Exhibit Number 2 is a log of the oil producing
2 rate versus time for the Harding Oil Company Shipp Number
3 1 Well. We also have the gas production shown here, and
4 I have extrapolated the present decline trend to determine
5 the remaining reserves for this well.

6 As I'll discuss later on, the total ultimate recovery
7 from this well based on the cumulative production to date
8 and the extrapolation of this decline curve indicates an
9 ultimate recovery of around 211,870 barrels of oil.

10 Q Now, refer to Exhibit 3 and explain this.

11 A Exhibit 3 is a similar plot for the Harding Oil Company
12 Shipp Number 5 Well. As you can see, it's a very new
13 well. It only went on production in February of this year.
14 There is not sufficient data to make any extrapolation of
15 remaining reserves.

16 Q Now, refer to Exhibit 4 and explain that.

17 A Exhibit Number 4 is a similar type plot for the Mesa
18 Petroleum Company Shipp Number 2. This well as of this
19 date was not exhibiting any decline in the producing rate
20 and is exhibiting a cost of producing rate. Therefore,
21 no extrapolation could be made of the production at this
22 time.

23 Q Now, have you made any volumetric calculations of oil
24 reserves in connection with any of the wells?

25 A Yes, I have, for the Harding Oil Company Shipp Number 1;

1 and those data are shown on Exhibit Number 5. These are
2 the same data that were shown in our original Hearing
3 approximately a year ago, and it shows an average porosity
4 of 80 percent, water saturation of 30, estimated recovery
5 of 20 percent, formation volume factor of 1.675 net feet
6 of pay of 46.

7 It gives us a recoverable oil per acre foot of
8 52 barrels. Assuming then the 80-acre drainage they
9 anticipate that these wells are draining, this gives us
10 an ultimate recovery of 191,360 barrels which we can see
11 agrees very well with the production decline curve
12 extrapolation.

13 Q Refer to Exhibit 6 and explain what this shows.

14 A Exhibit 6 is a plot of the bottomhole pressure versus
15 cumulative oil production for the Harding Oil Company
16 Shipp Number 1. When this reservoir was discovered, it
17 was undersaturated. It shows a rather sharp decline.
18 The bubble point is 3200 points. The two recent pressures
19 which are a result of the pressure after reaching the
20 bubble point extrapolate to an ultimate recovery of
21 approximately 210,000 barrels assuming an abandonment
22 bottomhole pressure of 250 pound.

23 So utilizing the data from the decline curve, the
24 volumetric calculation and the bottomhole pressure
25 extrapolation, we have an ultimate recovery in the

1 neighborhood of 200,000 barrels, which in my opinion proves
2 that we are draining approximately 80 acres of the
3 reservoir.

4 Q Now, have you made an economic study of what would happen
5 if this field were developed on 40-acre spacing rather
6 than 80?

7 A Exhibit Number 7 is the economics of drilling and completing
8 a Strawn well. Now, we have estimated the drilling and
9 completion costs of \$320,000; and the oil price, gas
10 price, the taxes are the various factors that go into the
11 economics of a well.

12 And utilizing these factors, we come up with a figure
13 of 101,266 barrels of oil will require to pay out the
14 drilling, completion and operation of a well to this pay.
15 So we have shown that we are recovering approximately
16 200,000 barrels of oil from 80 acres. Therefore, if we
17 were drilling on 40 acres, we would have a situation that
18 would result in a little more than a pay-out of the
19 original cost.

20 Q It would not hardly justify economically the drilling of
21 wells on the 40-acre basis?

22 A No. It certainly wouldn't.

23 Q What is your recommendation to the Commission with respect
24 to retaining the special pool rules that have been
25 adopted?

1 A I recommend that we retain the special field rules at
2 80-acre spacing and retain them on a permanent basis.

3 Q In your opinion, will this be in the interest of
4 conservation, the prevention of waste, and protect
5 correlative rights?

6 A Yes, it would.

7 MR. HINKLE: I believe that there is a letter in the
8 files of the Commission from the Mesa Oil Company.

9 MR. CARR: That's right.

10 MR. HINKLE: I'd like to indicate in the record what
11 this shows.

12 MR. NUTTER: We will get to that in a minute, Mr.
13 Hinkle.

14 MR. HINKLE: I'd like to offer into evidence Exhibits
15 1 through 7.

16 MR. NUTTER: Applicant's Exhibits 1 through 7 will
17 be admitted into evidence.

18 MR. HINKLE: That's all of the Direct.

19 MR. NUTTER: Are there any questions of Mr.
20 Williamson?

21 CROSS-EXAMINATION

22 BY MR. NUTTER:

23 Q Mr. Williamson, in effect, the only thing we have to show
24 here, the only thing we have here to show the drainage
25 on 80-acre spacing is the comparison of your production

1 decline curve with your calculated reserves under 80
2 acres, and that's not inclusive by any means. How would
3 you account for the fact that if we look at your plat,
4 Exhibit Number 1, we see that a 40-acre offset to the
5 North of this well was a dry hole. A 40-acre offset
6 to the West of it was a dry hole in the Strawn, and the
7 only two wells that offset each other and are productive
8 from the Strawn are 40-acre offsets, being the Number 1
9 and the Number 2? Do you have any pressure information
10 that shows that we are getting any kind of communication
11 beyond the 40-acre line?

12 A No, sir. I might mention this: I do not have a complete
13 data on the Mesa Number 4 Well. They apparently felt
14 like they would have had a completion there. They
15 perforated the pipe; and I understand they had some
16 mechanical problems that precluded them from completing;
17 but the Mesa feels like, in discussing with them, that they
18 could have made a well there without mechanical problems.

19 We do not have any other pressure information other
20 than we have shown in the past pressure. We had an
21 identical pressure between the Harding Shipp 1 and the
22 Mesa Number 2.

23 Q Was that introduced in the first Hearing?

24 A Yes. That was in the first Hearing. Now, we have
25 testified before, and I think it is fairly a matter of

1 the record, that this is a fairly erratic reservoir. It's
2 a stratigraphic trap. It has very little relationship to
3 structure as evidenced by the fact that the Number 6 Well
4 was a dry hole and structurally it should have been a good
5 well.

6 So the only thing we can go on reliably is, of course,
7 our volumetrics; and unless additional pressure data are
8 taken, we have no other data to support the fact that
9 we are draining 80 acres; but the log interpretation,
10 the bottomhole pressure cumulative data, and the
11 performance data do agree very strongly I feel. And it
12 does indicate we do have 80-acre drainage.

13 Q Well, you would agree with me, wouldn't you, maybe you
14 won't, but on your Exhibit Number 2 there you are
15 extrapolating a production decline curve based on a
16 rather limited band of performance as far as that goes;
17 and any error of just a couple of degrees could make a
18 considerable difference in the volume of oil?

19 A Well, I agree. Being the only data we had, that's what
20 we had to use; and, of course, that's why I went to the
21 pressure data on this well which I feel --

22 Q There have been no pressure interference tests conducted
23 or anything like that?

24 A No, sir. There have not been.

25 Q And no comparison of original pressures with subsequent

1 pressures of wells drilled except during the first Hearing
2 when Wells Number 1 and 2 pressures were compared?

3 A Right. Of course, the pressure in the Number 5 Well was
4 somewhat lower than the original pressure in the Number 1
5 Shipp Well. And this might indicate some drainage there.

6 Q Do you have any pressure information available on the
7 Number 5 when it was completed?

8 A Let's see. I believe I do. The Shipp Number 5 on June
9 the 4th of 1973 recorded a maximum pressure of 2,388 pounds.

10 Q What was the initial bottomhole pressure of the Number 1?

11 A And the Number 1 was considerably above that. The
12 bottomhole pressure of the Number 1 was 4,807 psig.
13 So I think we could infer the drainage had occurred. Of
14 course, the Number 4 Well in the middle of May clouded
15 that somewhat.

16 Q Now, at what point on this Exhibit Number 6 of bottomhole
17 versus cumulative production would this pressure on the
18 Number 5 well have been taken? What comparable point?

19 A Okay. June of '63.

20 Q You might have a date even for this last pressure that
21 you show on Exhibit Number 6.

22 A Right. I do. I think that will probably tie it in fairly
23 closely. Well 3 agrees very closely. The pressure, the
24 last pressure shown is the Shipp Number 1 of 1,035 pounds
25 taken 6-4-73.

1 Q That was taken the same date this other pressure was
2 run then?

3 A Right, on the same date.

4 Q Well, let's go on down from 4800 to 1035. The new
5 pressure in the Number 5 is 2388?

6 A Right. So the inference there could be of drainage, of
7 course, from the Number 1; or if it's a separate
8 stratigraphic trap, it could be of a different pressure.

9 Q Yes, I see that.

10 MR. NUTTER: Are there any further questions of
11 Mr. Williamson? He may be excused. Do you have anything
12 further, Mr. Hinkle?

13 MR. HINKLE: That's all.

14 MR. NUTTER: Do you have any correspondence?

15 MR. CARR: Mr. Examiner, the Commission has received
16 two letters related to this case. One is from a Mr.
17 J. L. Farrell, "Please be informed that Mesa Petroleum
18 Company respectfully requests the examiner approve the
19 80-acre proration unit currently established under the
20 special rules and regulations for the Humble City-Strawn
21 Pool, Lea County, New Mexico in Order No. R-4338."

22 "Mesa agrees with Harding Oil Company that 80-acre
23 proration units are adequate for economic drainage for
24 this particular reservoir."

25 We also have a letter from Texas International

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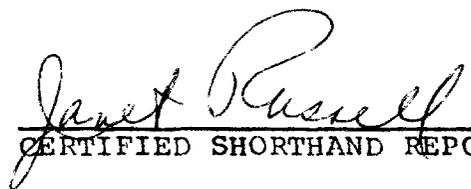
1 Petroleum Corporation signed by Mr. Robert O. Burkett.
 2 "This is to advise that as an operator in the Humble
 3 City Strawn Field, Texas International Petroleum Corporation
 4 petitions the retention of 80 acre proration units for
 5 each well completed from the Strawn lime in the above
 6 named field."

7 MR. NUTTER: Is there anything further for Case
 8 Number 4749? If not, we will take the case under
 9 advisement.

* * * * *

11 STATE OF NEW MEXICO)
) ss
 12 COUNTY OF BERNALILLO)

13 I, JANET RUSSELL, a Certified Shorthand Reporter, in
 14 and for the County of Bernalillo, State of New Mexico, do
 15 hereby certify that the foregoing and attached Transcript of
 16 Hearing before the New Mexico Oil Conservation Commission
 17 was reported by me; and that the same is a true and correct
 18 record of the said proceedings to the best of my knowledge,
 19 skill and ability.

20 
 21 CERTIFIED SHORTHAND REPORTER

22 I do hereby certify that the foregoing is
 23 a complete record of the proceedings in
 24 the Examiner hearing of Case No. 4749
 heard by me on 7/11, 19 73

25 , Examiner
 New Mexico Oil Conservation Commission

I N D E XWITNESSPAGE

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
OIL CONSERVATION COMMISSION CONFERENCE ROOM
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
June 6, 1973

EXAMINER HEARING

IN THE MATTER OF:)

In the Matter of Case No.)
4749 being reopened pursuant)
to the provisions of Order No.)
R-4338, which order established)
special rules and regulations for)
the Humble City-Strawn Pool, Lea)
County, New Mexico, including a)
provision for 80-acre proration)
units.)

Case No. 4749

BEFORE: Richard L. Stamets
Examiner

TRANSCRIPT OF HEARING

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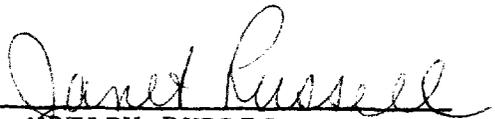
MR. STAMETS: Call next Case 4749 (reopened). In the matter of Case No. 4749 being reopened pursuant to the provisions of Order No. R-4338, which order established special rules and regulations for the Humble City-Strawn Pool, Lea County, New Mexico, including a provision for 80-acre proration units.

We have received a request from the Applicant that this case be continued until June 27, and it will be so continued.

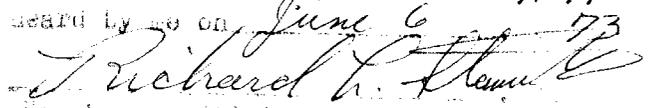
* * * * *

1 STATE OF NEW MEXICO)
) SS
2 COUNTY OF BERNALILLO)

3 I, JANET RUSSELL, a Notary Public, in and for the
4 County of Bernalillo, State of New Mexico do hereby certify
5 that the foregoing and attached Transcript of Hearing before
6 the New Mexico Oil Conservation Commission was reported by
7 me; and that the same is a true and correct record of the
8 said proceedings to the best of my knowledge, skill and
9 ability.

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12 NOTARY PUBLIC

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22 to hereby certify that
23 the foregoing and attached
24 transcript of hearing was
25 heard by me on June 6 1973 4749

Notary Public, Oil Conservation Commission

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
August 7, 1974

EXAMINER HEARING

IN THE MATTER OF:)
)
Case No. 4749 being)
reopened pursuant to the)
provisions of Order No.) Case No. 4749
R-4338-A, Humble City-)
Strawn Pool, Lea County,)
New Mexico.)

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the New Mexico Oil
Conservation Commission: Thomas Derryberry
Legal Counsel for the Commission
State Land Office Building
Santa Fe, New Mexico

For the Applicant: Paul W. Eaton, Jr., Esq.
HINKLE, BONDURANT, COX &
EATON
Hinkle Building
Roswell, New Mexico

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MR. NUTTER: The hearing will come to order, please.
The first case this morning will be number 4749.

MR. DERRYBERRY: Case 4749, in the matter of
Case Number 4949, being reopened pursuant to the provision
of order number R-4338-A, which order continued special
rules for the Humble City-Strawn Pool, Lea County, New
Mexico.

MR. EATON: Paul Eaton, Hinkle, Bondurant, Cox
& Eaton, representing Harding Oil Company and Mesa Petroleum
Company and I have two witnesses.

MR. NUTTER: Will you have them stand and be
sworn, please?

(THEREUPON, the witnesses were sworn.)

ROY C. WILLIAMSON, JR.

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

DIRECT EXAMINATION

BY MR. EATON:

Q Would you please state your name and residence and
by whom you are employed?

A I am Roy C. Williamson, from Midland, Texas. I
am President of the consulting firm of Sipes, Williamson
& Aycock, Inc.

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WILLIAMSON-DIRECT

Page.....4.....

Q Mr. Williamson, have you previously testified before this Commission?

A Yes, I have.

Q And in what capacity?

A As an engineering witness.

Q And have you previously testified before the Commission in connection with this matter?

A Yes, I have.

Q And have you prepared or had prepared certain exhibits for introduction?

A Yes.

Q Please refer to what has been marked for identification as Exhibit Number One and state what that exhibit is?

A Exhibit Number One is a thickness map, an iso type map, on the gross Strawn interval for the Humble City-Atoka-Strawn field in Lea County, New Mexico.

The contours shown are the isopack thicknesses and wells are shown and are color-coded as to zone of completion.

The wells that we will be concerned with are the ones colored blue, which are the Strawn completion and there are five of these.

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WILLIAMSON-DIRECT

Page.....5.....

Q. On the exhibit there are seven yellow eighty-acre tracts. Will your testimony concern those tracts?

A. No, sir, it will not.

Q. All right. Now, Mr. Williamson, please refer to what has been marked for identification as Exhibit Number Two, and state what that exhibit portrays?

A. Exhibit Number Two depicts certain data from the Strawn wells in the Humble City Strawn field.

The left-hand column identifies the operator and the wells and the next column is the initial date of production. Then, we have bottom hole pressure, ultimate oil recoveries and recovery per acre foot and net pay thickness calculated for each well. The purpose of this data is to indicate that the reservoir is performing such that drainage is occurring on eighty acre spacing.

I might point out that the Harding Shipp No. 1 was the initial well in the Strawn field. It had an initial bottom hole pressure of four thousand eight hundred and seven pounds.

The Mesa Petroleum Shipp No. 2 was completed one month later and had bottom hole pressure of thirty thousand four hundred and seventy-three pounds.

The Harding Shipp No. 5 was completed in February

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of '73, and it had an initial pressure of three thousand eight hundred and seventy-one pounds.

The TIPCO Nicholson No. 2 was completed 7-73, and with pressure of three thousand thirty-two pounds.

The Harding Oil Company Shaw No. 1 was completed in March of '74, and it had three thousand five hundred and fifty-five pounds.

I might also point out that there are several dry holes in the Strawn indicated in section fifteen of 37 east, 17 south. The Mesa No. 5 Shipp was a dry hole in the Strawn. To the east, one location, the Harding No. 1 Schwartzburg was a failure in the Strawn.

Q That was in section fourteen?

A Section fourteen of 37-17. Also in section eleven, north of the Harding No. 1 Shipp there is a dry hole. In section ten of 37-17 there is a dry hole north of the TIPCO No. 1 Nicholson.

MR. NUTTER: And those both were tested to the Strawn?

A Yes. I might also point out that even though these other wells are completed to various intervals, being the Wolfcamp, Atoka, and the Yeso, they also were failures in the Strawn.

Completion was either attempted or the formation was not sufficient to attempt completion. So therefore, they can really be considered failures in the Strawn.

The Strawn formation is generally, the accumulation is found in stratigraphic nature, and as you can see it is reasonably erratic and completions are offset by dry holes.

On this one dry hole back in section ten, out to the west of the TIPCO No. 2 Nicholson, is the TIPCO No. 3 Nicholson.

But the initial bottom hole pressure data indicates to me that communication does exist between these wells.

The anomalous situation is that in section eleven the PUBCO, or really Mesa, it was drilled by PUBCO, but of course PUBCO is owned by Mesa, the No. 4 Shipp was a failure in the Strawn and yet drainage seems to have occurred across this location as indicated by the pressure in the No. 5 Shipp of thirty-eight hundred pounds which is some thousand pounds below the Harding No. 1 Shipp. So, there must be some path of communication and this could be a localized situation in the Strawn as to why the Shipp No. 4 was a Strawn failure.

Going on to the ultimate oil recovery, the Harding Shipp No. 1 and the Mesa Shipp No. 2 are depleted in the Strawn and the Shipp No. 1 has produced approximately one hundred and sixty-four thousand barrels. The Shipp No. 2 has produced approximately a hundred and ninety-nine thousand barrels.

The Harding Shipp No. 5 is still producing and it is on a decline that can be extrapolated and the ultimate expected from this well is one hundred and twenty-nine thousand barrels.

The TIPCO Nicholson No. 2 is also on a decline that can be extrapolated and it will produce approximately eighty thousand barrels.

The next column shows the calculated recovery in barrels of oil per acre foot from each well which takes into account porosity and water saturation and formation volume factor for each well and the last column shows the net pay in thickness calculated from the location of these wells.

At the bottom of the exhibit, number one shows the ultimate oil recovery from the four wells, total five hundred and seventy-one thousand six hundred and five barrels.

I might mention that the Harding Shaw No. 1 is producing in the Strawn. It is not declining. It is producing at a constant rate and I was not able to get a performance derived ultimate so I did not include it in these calculations.

Number two at the bottom of the exhibit calculates the drainage area by dividing the ultimate oil recovery by the forty-eight barrels per acre feet times thirty-six point seven five net feet indicating an average drainage area for the four wells of three hundred and twenty-four acres or eighty-one acres per well.

So, by observing the pressure history and the volume metric calculations of the area, that would contribute to the amount of oil that we can pin down that can be produced from the four wells. I conclude that drainage is substantiated on an eighty acre unit.

Q (Mr. Eaton continuing.) Mr. Williamson, do you know whether or not Mesa Petroleum Company is interested in further drilling of this area?

A. Yes, sir. The Mesa personnel that I have visited with have indicated that they are interested in pursuing additional development in this area but only if eighty acre spacing is maintained. This will give them the economics

WILLIAMSON-DIRECT
-CROSS

Page 10

they must have to develop this somewhat erratic reservoir.

Q Based then upon your familiarity with the reservoir, and particularly your Exhibit Number Two, you are of the opinion that the Strawn will efficiently and effectively drain eighty acres?

A Yes, I do.

MR. EATON: No further questions of Mr. Williamson.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Williamson, what is the current rate of production on the three wells that are producing now?

A The Shipp No. 5 for May produced eighteen hundred and fifty barrels of oil. The TIPCO Nicholson No. 2 for May produced two thousand and fifty barrels. These are approximate and is read from a curve. And the Harding Shaw for May produced ten thousand six hundred and ninety-eight barrels.

MR. NUTTER: Thank you. Are there any further questions of Mr. Williamson? You may be excused.

(THEREUPON, the witness was excused.)

Do you have anything further, Mr. Eaton?

MR. EATON: One more witness, Mr. Justice.

JAMES O. JUSTICE

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

DIRECT EXAMINATION

BY MR. EATON:

Q State your name please and where you live?

A My names is James O. Justice and I live in Dallas, Texas.

Q And by whom are you employed, Mr. Justice?

A Harding Oil Company.

Q And what is your position with the Harding Oil Company?

A Chairman of the Board and Chief Executive Officer.

Q Have you previously testified before this Commission in connection with the first hearing on the field rules for the Humble City-Strawn Pool?

A Yes, sir, I have.

Q Do you have a statement which you would like to make to the Commission which has been marked as Exhibit Three?

A Yes, I do.

Q Would you please proceed with that?

A This is a statement to the New Mexico Oil Conservation Commission, Docket Number 4749, August Seven,

1974, special field rules for the Humble City-Strawn field.

Background. Under a farm-out agreement with Mesa Petroleum Company, Harding Oil Company has been developing this field with the participation of Texas International Petroleum Company. To date, Harding has drilled six wells, four producers and two dry holes.

Three of the producers are completed in the Strawn, and one in the Atoka. The accumulative production on the producers to May the first, 1974, ranges from a low of sixteen thousand one hundred and sixty-two barrels to a high of one hundred and fifty-six thousand two hundred and forty-six barrels.

Recent developments. During 1973, Harding drilled two wells and so far in 1974 it has drilled two wells with a third scheduled for spudding this month. All of these wells have or will test the Atoka formation.

Future plans. Under the farm-out agreement, seven eighty acre tracts remain to be earned. Due to the uncertain nature of the geology in this field, the sequence of drilling each of these locations is contingent upon the results of previous drillings.

An example of this rationale is our decision to abandon the location in the west half of the northeast quarter

of section fourteen, as a result of geological data gained from the two dry holes to the west in the east half of the northeast quarter of section fifteen and the west half of the northwest quarter of fourteen and Mesa No. 5 Shipp and Harding No. 1 Schwartzburg.

Based upon drilling results and performance history it is the judgment of the Harding Oil Company that this field does not economically justify development on forty acre spacing.

Formation characteristics appear to be such that one well will adequately drain eighty acres thereby avoiding underground waste.

Drilling results to date likewise indicate that correlative rights are better protected on eighty acre spacing than they would be on forty acre spacing due to the rather unpredictable nature of the petroleum bearing formation.

Conclusion. It is our conclusion that the trade-off between correlative rights and sound economics will best be served by continuing eighty acre spacing for that field.

That concludes my prepared statement.

Q Mr. Justice, this Exhibit Number One testified to

by Mr. Williamson, reflects seven yellow-colored eighty acre tracts.

Are those the eighty acre tracts which you have mentioned in your statement just now?

A. Yes, that is correct.

Q. Which will be earned by Harding if you proceed to drill those properties?

A. That is correct and our proposed location for the next well to be spudded this month is shown on that exhibit.

Q. In section twelve?

A. Yes, sir, in the west half of the northwest quarter.

Q. Do you have anything to add, Mr. Justice?

A. No, sir, I have nothing further.

MR. EATON: Pass the witness.

MR. NUTTER: I have no questions. Are there any questions of this witness? Thank you, Mr. Justice, you may be seated.

(THEREUPON, the witness was excused.)

MR. EATON: That concludes our case and we offer into evidence Exhibits One, Two and Three.

MR. NUTTER: Harding's Exhibits One, Two and Three will be received into evidence.

(THEREUPON, Applicant's Exhibits Numbers

One, Two and Three were admitted into evidence.)

MR. NUTTER: Do you have anything else, Mr. Eaton?

MR. EATON: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 4949?

MR. DERRYBERRY: Mr. Examiner, the Commission has received a letter from Robert O. Burkett who is the Division Manager of Texas International Petroleum Corporation and reads as follows:

In the matter of the rehearing for R-4338-A, special field rules for the Humble City-Strawn field, this is to advise that Texas International Petroleum requests the continuance of the eighty acre proration units based on the production data to date on the TIPCO No. 2 Nicholson well in the Humble City-Strawn Pool we cannot economically justify any development on a spacing pattern less than eighty acres per well.

MR. NUTTER: Is there anything further in Case 4749?

We will take the case under advisement.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 10, 1974

EXAMINER HEARING

-----)
IN THE MATTER OF:)
)
Case No. 4749 being reopened)
pursuant to the provisions of)
Order No. R-4338-A, which order)
continued special rules for the)
Humble City-Strawn Pool, Lea County,)
New Mexico.)
)
)
-----)

CASE 4749

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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

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MR. NUTTER: We will call next Case 4749.

MR. DERRYBERRY: Case 4749 in the matter of Case 4749 being reopened pursuant to the provisions of Order No. R-4338-A, which order contined special rules for the Humble City Strawn Pool, Lea County, New Mexico.

Mr. Examiner, we have a letter here from Mr. Clarence Hinkle, Attorney for the Applicant and it states as follows:
(Reading) Appearing on the Examiner's Docket for July 10th is Case No. 4749 which is being reopened pursuant to the provisions of Order No. R-4338-A, which Order continued special pool rules for the Humble City-Strawn Pool, Lea County, New Mexico. We represent Harding Oil Company who is the original proponent of the special rules and due to the unavailability of witnesses for Harding for both July 10th and July 24th because of vacations, please consider this as a motion on behalf of Harding to continue this Case until the Examiner's Docket of August 7. (End of reading.)

MR. NUTTER: Case No. 4749 will be continued until the Examiner Hearing scheduled to be held at this same place at 9 o'clock A.M., August 7, 1974.

dearnley, meier & mc cormick

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
CONFERENCE HALL, STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

June 28, 1972

EXAMINER HEARING

IN THE MATTER OF:)
Application of Pubco Petroleum)
Corporation for Special pool rules,)
Lea County, New Mexico.)
<u> a n d </u>)
Application of Harding Oil Company)
for a discovery allowable and)
special pool rules, Lea County, New)
Mexico.)

CASE NO. 4748

CASE NO. 4749

BEFORE: Elvis A. Utz
Examiner

TRANSCRIPT OF HEARING

1 MR. UTZ: Case 4748.

2 MR. HATCH: The Application of Pubco Petroleum
3 Corporation for special pool rules, Lea County, New Mexico.
4 I think we need a decision as to whether we are going to
5 hear these cases at the same time, Case 4748, the Application
6 of Pubco, and Case 4749, the Application of Harding Oil.

7 MR. HINKLE: Clarence Hinkle of Hinkle, Bondurant
8 and Christy, Roswell, New Mexico, appearing on behalf of
9 Harding Oil Company. We would like to enter our appearance
10 in Cases 4748 and 4749, and we have no objection to
11 consolidating the Cases for the purpose of taking testimony.

12 MR. BUELL: Sumner Buell of Montgomery, Federici,
13 Andrews, Hannahs and Morris, I would like to enter my appearance
14 on behalf of H. L. Brown, Jr.

15 MR. SPERLING: James Sperling of Modrall, Sperling,
16 Roehl, Harris and Sisk, Albuquerque, appearing on behalf of
17 Pubco Petroleum Corporation in Cases 4748 and 4749. We have
18 no objection to the consolidation of the two Cases for the
19 purpose of testimony.

20 MR. UTZ: In absence of objection, Applications
21 4748 and 4749 will be consolidated, for the purpose of
22 testimony.

23 MR. HATCH: I have a question that I would like
24 Mr. Hinkle, Mr. Sperling and Mr. Buell to review for a
25 moment before we proceed.

1 In the Affidavit of Publication for Case 4749, there
2 was something left out. The pool name is the principal thing
3 that was left out.

4 MR. HINKLE: I don't think that makes a whole lot
5 of difference, it is identified by Township and well
6 identification.

7 MR. HATCH: I am not disturbed about it, but I
8 don't know about you or Mr. Sperling.

9 MR. HINKLE: Jim, the pool name is the only thing
10 left out, the Township and Range and discovery well are all
11 identified.

12 MR. SPERLING: I have no objection to proceeding.

13 MR. HINKLE: I have none.

14 MR. UTZ: Cases 4748 and 4749 have been called.

15 Mr. Speling, how many witnesses do you have?

16 MR. SPERLING: Two.

17 MR. UTZ: How many witnesses do you have, Mr.
18 Hinkle?

19 MR. HINKLE: Three.

20 MR. UTZ: Will all five witnesses stand and be
21 sworn at this time?

22 (Whereupon, five witnesses were sworn simultaneously
23 by Mr. Hatch.)

24 MR. UTZ: You may proceed when you are ready,
25 Mr. Sperling.

1 exploration of the Permian Basin in the southeastern
2 New Mexico area. I was employed from 1962 until 1968
3 by Mobil Oil Corporation as an exploration geologist
4 primarily working in southeast New Mexico.

5 From 1968 until the present time, I have been
6 employed by Pubco Petroleum Corporation. I am a member
7 of the American Association of Petroleum Geologists.

8 Q Now, Mr. Causey --

9 MR. SPERLING: Are Mr. Causey's qualifications
10 accepted?

11 MR. UTZ: Yes, they are.

12 Q (By Mr. Sperling) Mr. Causey, would you please now
13 refer to what has been marked as Exhibit 1 in this Case,
14 Case 4748, and explain briefly the purpose of that
15 Exhibit and what it is designed to show?

16 A Exhibit 1 is a scale of one inch to two thousand feet,
17 which is indicated on the map, and is outlined as the
18 proposed Humble City-Strawn Pool area comprising
19 Sections 6, 7, 18, in Township 17 South, Range 38 East;
20 and Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, in
21 Township 17 South, Range 37 East.

22 We have also designated on the map, the Lovington
23 East and Lovington Northeast pools.

24 Also marked on the Exhibit is the discovery well
25 of the Humble City-Strawn Pool, the Harding Oil Company

1 Number 1 well.

2 Exhibit 1-A is a geological cross-section which
3 has been indicated on Exhibit 1 by two red lines,
4 designated B to B' and A to A'. Represented on this
5 Exhibit is the electric logs and the radioactive logs
6 of the stratographic section on datum from the top and
7 middle of the Pennsylvanian-Strawn. The scale of this
8 map is a vertical scale of one inch to 100 feet and a
9 horizontal scale of twelve inches equaling one mile --

10 MR. UTZ: Why don't you give us the datum?

11 A (Continuing) This is not a structural section, this
12 is my interpretation of the Lovington East and the
13 Lovington Northeast Strawn area and the discovery well,
14 the Harding Oil Company Number 1 Shipp. The discovery
15 well is producing from limestone of the Pennsylvanian-
16 Strawn at an average depth of approximately 1,450 feet.
17 I believe the Humble City-Strawn Pool is producing from
18 a stratographic trap which resulted from a bank or a
19 reef buildup within the Strawn.

20 Referring back to Exhibit 1-A, within the area
21 mapped, I believe there are three different Pennsylvanian-
22 Strawn banks or reefs producing.

23 I have designated these banks as Strawn Bank B',
24 Strawn Bank B and Strawn Bank C.

25 The red on the cross-section indicates the producing

1 interval in each well in this zone. Designated as the
2 Strawn B' and colored in green on both cross-sections,
3 I believe is the prevalent zone which produces in the
4 Humble City-Strawn field.

5 This cross-section which started with the State
6 Shell Monty Number 1 in Section 14, Township 16 South,
7 Range 36 East, was a dry hole which penetrated the
8 Strawn.

9 The Southwest Production Corporation Monty
10 State C in Section 24, Township 16 South, Range 36 East,
11 was completed from the Strawn and has since been
12 abandoned with an accumulated production of 4,114 barrels
13 which was produced from 7/14/69.

14 The next well is the Monty State Number 2 in
15 Section 19, Township 16 South, Range 37 East and it is
16 also producing from the Strawn. These two wells are
17 producing from the Strawn at the B' bank.

18 The Tidewater Monty B Number 1 in Section 19,
19 Township 18 South, Range 37 East is still producing from
20 what I have designated the Strawn Bank C and has an
21 accumulative production of 325,156 barrels of oil and
22 was completed 3/26/53 and is still producing.

23 The Getty Oil Corporation Monty D Number 1 in
24 Section 18, Township 16 South, Range 37 East, is a
25 dry hole.

1 The Pennzoil United State C Number 2 in Section 17,
2 Township 16 South, Range 37 East, was completed from
3 what I believe to be the middle bank, or the Strawn
4 Bank B. This was completed on 6/25/69 and up to 5/1/72
5 had an accumulative production of 286,215 barrels of
6 oil.

7 These are the wells I have used on the cross-section,
8 the A to A' cross-section.

9 On the B to B', starting with the first well, the
10 Amerada Petroleum State LC Number 1, in Section 1,
11 17 South, 36 East, was a dry hole.

12 The Skelly Oil Corporation Taylor Number 6 in
13 17 South, 37 East, was a dry hile in the Strawn.

14 The Tidewater Oil State B Number 1 in Section 5,
15 17 South, 37 East, was completed from the Strawn Bank
16 B' and had an accumulative total production of 60,297
17 barrels of oil. It has been abandoned.

18 The Tidewater Baton Number 1 in Section 5, 17
19 South, 37 East, was completed 3/3/52 and is abandoned
20 and produced only 58,751 barrels of oil from the Strawn
21 Bank B'.

22 The Tidewater State Number 1 in Section 4,
23 Township 17 South, Range 37 East, was completed 8/29/51,
24 and is abandoned. The total accumulated production was
25 19,647 barrels of oil. It was also completed in the

1 Strawn Bank B'.

2 The Tidewater Oil Company State Eugene Number 1 D
3 in Section 32, 16 South, 37 East, was completed from
4 what I believe to be both the Strawn B' and the Strawn
5 Bank C. It perforated both banks and has a total
6 accumulative production of 420,765 barrels of oil and
7 is still producing.

8 The last log on the cross-section B to B' is
9 the Shell Oil Company State Number 1 in Section 28,
10 16 South, 37 East. This well was a dry hole.

11 If I could refer you now to Exhibit 1 again, the
12 solid blue contour line on this Exhibit represents the
13 lower and middle Strawn as was designated on the cross-
14 section A to A' and B to B'. The isopach was contoured
15 at 250 foot intervals and the green isopach contours
16 represent the isopach of what I have designated as the
17 Strawn Bank B'. It is also contoured at 250 foot
18 intervals.

19 This isopach does not represent a net porosity and
20 does not indicate that all portions of the Strawn B'
21 along the trend as mapped would be porous and permeable.
22 I do feel that the limits of the green outline represent
23 this bank or reef trend across the area mapped.

24 Along the trend that we have mapped, we should
25 anticipate and expect separate carbon buildups of porous

1 permeable rock and I believe this is the case in the
2 area under consideration.

3 I believe the Humble City-Strawn Pool is producing
4 from the same bank as the Lovington East field, but it
5 is separate carbon buildup.

6 The discovery well in the Humble City-Strawn Pool,
7 the Harding Oil Company Shipp number 1, was some 287 feet
8 structurally lower than the edge well of the Lovington
9 East field, the Tidewater State U Number 1 located in
10 Section 4, Township 17 South, Range 37 East. I
11 might also point out on Exhibit 1 that the values on
12 the map underlined in green beside each control point,
13 represent the thickness of the mapped Strawn Bank B'
14 interval. The blue beside each control point represents
15 the thickness of the isopach of the lower and middle
16 Strawn interval.

17 Q Mr. Causey, I take it from what you have said, that you
18 feel there is a separation between the Lovington East
19 field and the Humble City-Strawn Pool; is that your
20 conclusion?

21 A That is correct.

22 Q Even though the wells from both of the areas may be
23 producing from what you have designated as the Strawn
24 B' Bank?

25 A That is correct.

- 1 Q Now, does the fact that the wells which are located
2 in the Lovington East Pool which you have referred to
3 and which you have shown on your cross-section and which
4 are abandoned, support that conclusion in view of the
5 recent production encountered in the Humble City-Strawn
6 Pool?
- 7 A Yes, I think that is correct.
- 8 Q Now, do I understand from the configuration of the
9 contour line which runs across the Humble City-Strawn
10 Pool, that you have concluded that that is the limit
11 of possible Strawn production from the area or is there
12 the possibility that these other members that you have
13 identified may indicate production to the north?
- 14 A I believe that we have the possibility of production
15 from the north. Presently there are two producing wells
16 within the Humble City-Strawn Pool developing production
17 from other Strawn zones which I have designated as the
18 Strawn Bank B and the Strawn Bank C to the north.
- 19 I think this is substantiated by the production in
20 the Lovington Northeast and the Lovington East Pool
21 area where we pick up these two zones as they move to
22 the north edge of the Strawn B' Bank trend. So I feel
23 that we could establish production to the north of the
24 trend as outlined.
- 25 Q Do you have anything else to comment on insofar as

1 Exhibits 1 and 1-A are concerned?

2 A I believe that's all that I have -- there is a specific
3 point I would like to bring out in summary. I believe
4 there are three different banks or reefs within the
5 Pennsylvanian-Strawn formation in the mapped area. The
6 Humble City-Strawn Pool and the Lovington East Strawn
7 Pools are producing from separate stratographic controlled
8 traps within the Strawn B' zone. This is evidenced
9 by the Strawn structural position of the Humble City-
10 Strawn Pool relative to the Lovington East Pool.

11 Only one well is still being produced by pumping
12 in the Lovington East Pool, as compared to two in the
13 Humble City-Strawn Pool.

14 The proposed pool outlined, I believe, is a
15 reasonable outline which allows for shifting of the
16 primary Strawn Bank trend plus the possible development
17 within additional Strawn zones.

18 In my opinion, 160 acre spacing will not lead to
19 unnecessary dry holes as compared to 80 acre spacing
20 because of the flexibility within 160 acre spacing units
21 as proposed by Pubco.

22 The Lovington East Pool was, for all practical
23 purposes, drilled on 160 acre spacing with a minimum of
24 dry holes and considering the fields within southeast
25 New Mexico, specifically the Husk field, were developed

1 on 160 acre spacing and, in my opinion, the character
2 of the rock encountered in the area indicates that one
3 well will adequately drain 160 acres.

4 Q In that connection, Mr. Causey, let me call your
5 attention to the Lovington East area and those three
6 wells that you included in your cross-section, two of
7 which are within Section 5 and one being in Section 4.
8 Those wells actually appear to be drilled on 160
9 acre spacing; is that correct?

10 A That is correct, for all practical purposes, they were.

11 Q And they have produced to abandonment?

12 A That is correct.

13 Q Let me know refer you to Exhibit 1-B, what is the purpose
14 of this Exhibit?

15 A Exhibit 1-B is a reduced copy of the logs on the Harding
16 Oil Company Shipp Number 1, in Section 11, Township
17 17 South, Range 37 East, and a porosity log of the Pubco
18 Shipp Number 2. This Exhibit shows the Strawn section
19 encountered in these two wells, and our correlation
20 of the Strawn B' Bank relative to the top of the Strawn
21 middle and lower sections and the top of the Pennsylvanian-
22 Atoka.

23 Q Does Exhibit 1-B correspond scale-wise with the logs
24 shown on Exhibit 1-A?

25 A Yes, it is approximately the same scale as the

1 cross-section, A to A' and B to B' for comparison
2 purposes.

3 Q Do you have anything else, Mr. Causey, at this time?

4 A That's all.

5 MR. SPERLING: That is all the testimony we have
6 from this witness right now.

7 * * * * *

8 CROSS-EXAMINATION

9 BY MR. HINKLE:

10 Q Mr. Causey, I notice that you have labeled Exhibit 1-A
11 as a stratographic cross-section, now, is it your
12 position that this entire area is stratographic and not
13 dependent on structure?

14 A I believe the Strawn is primarily stratographically
15 controled.

16 Q Now, you have labeled here three different Strawn
17 banks, the Strawn Bank B', the Strawn Bank B, and the
18 Strawn Bank C, are those stratographic traps within the
19 stratographic Strawn area?

20 A I believe that they are, although I have not mapped
21 in detail in terms of trends, bank trends, of the Strawn
22 B and Strawn C banks. All evidence, however, indicates
23 that they are.

24 Q In your opinion, is there communication between these
25 banks?

- 1 A In general, I would say no, however, I will qualify
2 that by saying that one well in Section 32, Township 16
3 South, Range 37 East, was drilled and completed from
4 the Strawn B' and the Strawn C Bank. It is possible in
5 a case such as this, that those two banks could be
6 in communication.
- 7 Q Each bank could be a separate pool, you might say?
- 8 A Yes, I believe, in a general sense, they are.
- 9 Q Generally, they probably would be?
- 10 A Yes.
- 11 Q Now, you can go from one bank to another and you could
12 have a dry hole offsetting another one; could you not?
- 13 A That is correct.
- 14 Q Are you apt to have more dry holes in 160 acre spacing
15 than you would have in 80 acre spacing?
- 16 A If we look at the analogy that we have in the Lovington
17 East pool, I think we can say from that development that
18 that pool on 160 acre spacing was not more risky than
19 it would have been on 80 acre spacing.
- 20 Q Is that your opinion of this area, the Humble City-Strawn
21 area?
- 22 A Yes, it is.
- 23 Q Now, referring to Exhibit Number 1, you have outlined
24 the proposed Humble City-Strawn Pool?
- 25 A Yes.

dearnley, meier & mc cormick

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1 Q What control did you figure for the boundaries of this
2 pool?

3 A Well, I think it is obvious that only drilling is
4 going to determine the exact boundaries of the field.

5 Q These are just arbitrary boundaries that you have
6 drawn?

7 A This interpretation was based on the one discovery
8 well which was drilled and has held up reasonably well
9 to date. We feel that these are approximately correct,
10 but this outline would allow minor shifting of the bank
11 either to the north or the south as the field is developed.

12 Q Well, with the trend that you have shown here, your
13 best chance at production is within the dotted green
14 lines, the broken lines (indicating)?

15 A With the information that we have today, but we realize
16 that it can shift.

17 Q Have you made any reservoir studies of the area at the
18 present time?

19 A No, I have not.

20 MR. SPERLING: We have a witness that has.

21 Q (By Mr. Hinkle) Now, if the Commission were to approve
22 160 acre spacing, the Number 1 Well in Section 11 which
23 is in the SW/4 would have the SW/4 dedicated to that
24 well; is that right?

25 A Yes, that is correct.

- 1 Q And the SE/4 would be dedicated to your well?
- 2 A That is correct.
- 3 Q Now, you are drilling, as I understand it, a well which
- 4 is indicated in the NW/4; is that right?
- 5 A That is correct.
- 6 Q What is the other location there, the location of the
- 7 Harding well?
- 8 A This is Harding's second location (indicating).
- 9 Q This is going to result in a 40 acre location, you
- 10 might say, at the present time; is it not?
- 11 A As it is spaced at the present time, on these four
- 12 wells, it would be (indicating).
- 13 Q What is the exact location of your well Number 2, which
- 14 is located in the SE/4 of Section 11?
- 15 A The Pubco Number 2 Shipp is located 2,130 feet from the
- 16 east line and 1,980 feet from the south line.
- 17 Q 1,980 feet from the south line?
- 18 A Correct.
- 19 Q Now, if you had located that in the center of the NW of
- 20 the SE/4, it would be 660 feet from the east-west line
- 21 of that quarter; would it not?
- 22 A Would you repeat that?
- 23 Q If your Number 2 well had been located in the center of
- 24 the NW of the SE/4 of Section 11, it would have been 660
- 25 feet from the east line of the quarter Section, would it

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1 not have been?

2 A Yes, I believe that is correct.

3 Q Now, since you located it where you did -- you located

4 it 150 feet farther west to get closer to the Number 1

5 Well; did you not?

6 A Well, in the absence of any established pool spacing

7 rules, we went on the 40 acre state-wide spacing.

8 Q You got as close as you could to the discovery well;

9 is that right?

10 A Yes, basically, that is right.

11 Q Isn't the same true of your well that you are drilling

12 now in the NW/4 of Section 11, you got as close as you

13 could there too; did you not?

14 A Yes, I believe we did. Yes, that is correct.

15 Q Now, are you going to have a plat here?

16 MR. SPERLING: Yes.

17 Q (By Mr. Hinkle) At the time you located these two

18 wells, did you have in mind wider spacing than 40 acres?

19 A Yes, we did.

20 Q Why did you locate -- why didn't you step out and

21 locate it farther away if you thought one well would

22 drain 160 acres?

23 A Well, I think we took the course of action that most

24 people would take in that, without established pool

25 rules, we moved it as close as we could to the

1 discovery well until such time as spacing rules could
2 be established.

3 Q Now, if the Commission should approve 160 acre spacing
4 in this area, and as I understand it, you are asking for
5 permission to drill in any 40 acre component of 160
6 acres; is that correct?

7 A That is correct.

8 Q Would that not result in the same situation that you
9 have here? You have four wells located together, as
10 you go to the next area, aren't you apt to have your
11 offset wells in the same way?

12 A That is possible, but you would also, of course, have
13 160 acres to drain.

14 Q It might depend somewhat on the ownership of the acreage;
15 would it not?

16 A Well, it would probably depend on numerous factors.

17 Q But you might have this reoccur?

18 A This is possible.

19 Q It is a possibility?

20 A Yes.

21 Q So you have four wells together and that would mean
22 you would step out considerably and it could mean if
23 you stepped out that far, that you might get a dry
24 hole because of the stratographic situation?

25 A Certainly anytime you drill a well you run the risk of

1 getting a dry hole, but the flexibility within 160
 2 acre spacing would give you -- I think it would reduce
 3 your dry hole risk when the field is developed and we
 4 obtain more datum to determine the next location.

5 MR. HINKLE: Do you have a witness that will refer
 6 to core analyses?

7 MR. SPERLING: Yes.

8 MR. HINKLE: I think that's all.

9 MR. UTZ: Any further questions?

10 (No response.)

11 * * * * *

12 CROSS EXAMINATION

13 BY MR. UTZ:

14 Q Mr. Causey, I have one or two questions.

15 This large -- or heavy dotted green line, do you
 16 consider that to be the trend of the Strawn zone
 17 throughout the three pools?

18 A That is correct, that is my interpretation of the
 19 Strawn Bank B'.

20 Q Would you give me the control information?

21 A All right, starting in Section 11 of Township 17 --

22 Q Why don't you just limit yourself to the area in
 23 question -- well, go ahead and give me whatever you want.

24 A In Section 11, Township 17 South, Range 37 East, we
 25 have two control points. In Section 6 of 17 South, 38

- 1 East, we have four control points. Those are the
2 control points in the approximate SE/4 of the map area.
- 3 Q Can you give me anything over in the area of 17 South,
4 36 East?
- 5 A Yes, we have one well in Section 36, excuse me, Section
6 1 of 17 South, 36 East. It is the extreme western well
7 on our B' cross-section.
- 8 Q What Section?
- 9 A Section 1. There are also three control points in
10 Section 12 of Township 17 South, Range 36 East. The
11 control points are circled with larger circles and the
12 values underlined in green are the values of the thickness
13 of the B'.
- 14 There is also a control point in Section 6 of 17
15 South, 37 East.
- 16 Q Did you give me one for Section 33?
- 17 A Section 33 of 16 South, 37 East is not deep enough, it
18 has not been penetrated to the Strawn.
- 19 Q So you are a little short in control in the areas of
20 Sections 33 and 32, all the way down to Section 6 of
21 17 South, 37 East?
- 22 A Would you repeat that area again?
- 23 Q Well, beginning in Sections 32 and 33 of 16 South,
24 37 East, the north boundaries of your control. I mean
25 your green line goes over to Section 6 of 17 South,

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1 37 East. You are a little short in control at that
2 point; aren't you?
3 A Yes.
4 Q Now, I believe they were called blue, I'm a little
5 color-blind, obviously, because they look more green
6 to me. I think on your contour surrounding Section 11,
7 that your control on that isn't too good. Is that your
8 control on the wells in Section 11?
9 A That is correct, but I might point out that the
10 interpretation of the Bank B' was projected at greater
11 than 50 feet and in this location, we encountered the
12 discovery well at 64 feet and the Pubco Number 2 was
13 encountered at 35 feet.
14 Q Both these wells are only completed in your B' zone?
15 A That is correct.
16 Q The one that you designated as B'?
17 A Right.
18 Q Were the other zones tested?
19 A We did not have any pore spaces at equivalent intervals
20 of the other two banks of the zone.
21 MR. UTZ: Does anyone have any further questions?
22 * * * * *
23 CROSS-EXAMINATION
24 BY MR. HINKLE:
25 Q In your previous testimony, Mr. Causey, you indicated

1 that the wells which were drilled in Sections 4 and 5
2 could be considered as being on 160 acre spacing. Now,
3 isn't it true also that that is a perfect location for
4 80 acre spacing because each one is located at the west
5 end of 80 acres?

6 A That is correct, but also, the spacing between them
7 would have to be taken into consideration.

8 Q Is it not true then that they could be either?

9 A That is correct, but for practical purposes and drainage
10 purposes, I believe 160 acres would be more applicable.

11 Q You indicated in your last testimony that you used the
12 wells in Section 11, the discovery well and the well
13 Pubco has drilled, for your control. Now, isn't it
14 true that you gave this same geological map to the
15 Harding Oil Company, or the individual that you gave
16 this information out to, and they drilled a well on the
17 strength of this geology?

18 A That is correct, they drilled on this interpretation.

19 Q So, actually, these wells were not used as control
20 points in preparing this plat?

21 A In the original interpretation, that is correct.

22 MR. HINKLE: I might say that our Exhibits are
23 substantially the same as this and they were obtained from
24 Pubco.

25 MR. UTZ: It was mentioned, on Cross-Examination,

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that the area was farmed out by Pubco, is the farm-out on an 80 acre checkerboard?

MR. SPERLING: That, as yet, is undetermined. There seems to be some ambiguity in the contract.

MR. HINKLE: We will have some testimony on that.

MR. UTZ: Any further questions?

(No response.)

MR. UTZ: The witness may be excused.

(Witness excused.)

* * * * *

CHARLES SANDERS,

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

DIRECT EXAMINATION

BY MR. SPERLING:

Q Please state your name.

A Charles Sanders.

Q Where do you live, Mr. Sanders?

A Albuquerque.

Q By whom are you employed and in what capacity?

A I am employed by Pubco Petroleum Corporation as a petroleum engineer.

Q Have you, on any previous occasion, testified before the Commission so that your qualifications as a petroleum engineer, are a matter of record?

- 1 A No, I have not.
- 2 Q In that event, would you please briefly outline your
3 education and professional training and experience
4 qualifying you as a petroleum engineer?
- 5 A I graduated from Texas Technology College in 1950 with
6 a B.S. in Petroleum Engineering. Subsequently I worked
7 for three years for the Texas Pacific Coal and Oil
8 Company in the north-central Texas area and later as
9 assistant division manager for the same company. I
10 then worked for sixteen years in west Texas and northwest
11 New Mexico as a reservoir engineer.
- 12 Q Are you a registered professional engineer?
- 13 A In the State of Texas, yes.
- 14 Q How long have you been with Pubco?
- 15 A For three years.
- 16 Q Are you familiar with the area which is the subject of
17 this Application, Mr. Sanders?
- 18 A Yes, I am.
- 19 Q Would you please refer to what has been identified as
20 Exhibit 2, please? Tell us what that Exhibit is.
- 21 A Exhibit 2 is a land ownership map of the proposed
22 Humble City-Strawn Pool and the surrounding area. It
23 primarily shows the land ownership of the proposed pool
24 and also shows a partial outline of the Lovington East
25 field.

1 Q And, of course, shows the two wells located within the
2 proposed Humble City-Strawn Pool area that have been
3 completed?

4 A Yes, sir, including the Number 3 Shipp -- the Pubco
5 Number 3 Shipp which is now being drilled in the NE of
6 Section 11.

7 Q Now, would you refer, please, to what has been marked
8 as Exhibit Number 3 and tell us the purpose of that
9 Exhibit and what it shows?

10 A Exhibit 3 is a tabulation of the well and completion
11 data for the two wells now existing in the Humble City-
12 Strawn Pool, the Harding Oil and Gas Company Shipp Number
13 1 and the Pubco Petroleum Corporation Shipp Number 2.
14 The location of the Harding well is 2,060 feet from the
15 west line and 2,310 feet from the south line in 17 South,
16 37 East, Section 11.

17 The Pubco Petroleum Corporation Shipp Number 2 is
18 2,130 feet from the east line and 1,980 feet from the
19 south line of Section 11.

20 The total depth of the Harding well is 11,643
21 feet and the total depth of the Pubco well is 11,685.

22 The next significant figure is the completion
23 dates and these are March 9th for the Harding Shipp Number
24 1 and June 10th, 1972 for the Pubco Shipp Number 2.

25 The perforated intervals for the two wells are

1 shown. The Harding well perforation is to an interval
2 of 32 feet and the Pubco well to 26 feet. The Harding
3 Oil and Gas Company Shipp Number 1 had a potential
4 originally, of 286 barrels of oil per day with a gas-oil
5 ratio of 1,000 and a flowing tube pressure of 16.

6 The well's repotential on April 18, 1972, was
7 624 barrels of oil with a gas-oil ratio of 1,098 and
8 a flowing tube pressure of 55.

9 On June 10, 1972, it was producing 2,758 barrels
10 of oil per day with a GOR of 1,662 and a flowing tube
11 pressure of 700 pounds.

12 The oil gravity is essentially the same in both
13 wells, approximately 45 degrees API. The net pay of
14 the Harding well was 34 feet and the net pay of the
15 Pubco was 30 feet.

16 The average porosity which we determined on the
17 Harding well was 5.1 percent and 6.30 percent for the
18 Pubco Number 2. The permeability was not determined
19 for the Harding well and in the Pubco Shipp Number 2,
20 it averaged 20 millidarcys.

21 The water saturation was determined to be 25 percent
22 in both wells.

23 The reservoir pressure was 4,800 PSI in the Harding
24 Well and 3,743 PSI in the Pubco well.

25 Q Would you refer to Exhibit 4 now and explain what it shows?

1 shown. The Harding well perforation is to an interval
2 of 32 feet and the Pubco well to 26 feet. The Harding
3 Oil and Gas Company Shipp Number 1 had a potential
4 originally, of 286 barrels of oil per day with a gas-oil
5 ratio of 1,000 and a flowing tube pressure of 16.

6 The well's repotential on April 18, 1972, was
7 624 barrels of oil with a gas-oil ratio of 1,098 and
8 a flowing tube pressure of 55.

9 On June 10, 1972, it was producing 2,758 barrels
10 of oil per day with a GOR of 1,662 and a flowing tube
11 pressure of 700 pounds.

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13 wells, approximately 45 degrees API. The net pay of
14 the Harding well was 34 feet and the net pay of the
15 Pubco was 30 feet.

16 The average porosity which we determined on the
17 Harding well was 5.1 percent and 6.30 percent for the
18 Pubco Number 2. The permeability was not determined
19 for the Harding well and in the Pubco Shipp Number 2,
20 it averaged 20 millidarcys.

21 The water saturation was determined to be 25 percent
22 in both wells.

23 The reservoir pressure was 4,800 PSI in the Harding
24 Well and 3,743 PSI in the Pubco well.

25 Q Would you refer to Exhibit 4 now and explain what it shows?

1 A Exhibit Number 4 is a gamma-ray neutron log run on
2 the Pubco Shipp Number 2. On the left side of the log
3 we see the top of the Strawn and the middle lower zone
4 at 11,425 feet. The left-hand corner of the top shows
5 the Atoka at 11,684 feet.

6 The interval between is referred to as the Strawn
7 limestone.

8 The vertical column on the left side is the depth
9 column interval for the Pubco Shipp Number 2. The
10 significant factor on this test was the rate of
11 production which flowed and there was no water recovered.

12 The shut-in bottom hole pressure was 7,633 and the
13 final maximum pressure was 3,473 which was reached in
14 ten minutes and continued at 3,473 for the remainder of
15 the 90 minute shut-in test.

16 At the bottom of Exhibit 4, we show the porosity
17 scale for the sidewall neutron porosity log on a
18 standard scale. We have used this scale in determining
19 the net amount of pay in the Pubco well.

20 In the upper interval, we have a net pay of 11,430
21 feet down to 11,453 feet, or a total of 23 feet in which
22 that maximum porosity was reached.

23 In the lower interval, we had 7 feet from 11,463
24 to 11,470. The total amount of net pay therefore, was
25 30 feet and the average log porosity was determined to

1 be 6.30 percent or 189 porosity feet.

2 I would like to point out, at this time, that
3 we will refer to the analysis data later, but the core
4 analysis showed a net pay of 29.1 feet with an average
5 of 6.0 porosity. The log porosity at the same interval
6 calculated 5.92 percent, so we do have real close
7 agreement between the log porosity and the core
8 proosity.

9 Q Anything else on Exhibit 4 at this time?

10 A I believe that's all.

11 Q Now, referring you to what has been marked as Exhibit 4-A,
12 would you explain what that is?

13 A Exhibit 4-A is a gammaray neutron log run on the
14 Harding Oil and Gas Company Shipp Number 1 Well. The
15 left side of the gammaray is the top of the Strawn
16 which is 11,430 feet and the top of the Atoka. The
17 zone was perforated at 11,420 to 11,452. The rectangular
18 box represents the drill stem test from 11,420 to 11,475.
19 The maximum shut-in bottom hole pressure on the test was
20 4,800 PSI which we assumed to be the original sealed
21 bottom hole pressure.

22 Q And the pressure confirms your tabulation as shown on
23 Exhibit 3 of the initial bottom hole pressure?

24 A Yes, sir.

25 In the lower left-hand corner, you will find the

1 porosity scale which was found to be correlative with
2 the core porosity and the porosity that was used in
3 determining the net feet of pay for this well. This
4 scale was not used because we felt it gave an
5 unrealistic porosity value, so the other scale was
6 used and it was determined that there was 28 feet of
7 net pay within the perforated interval and 6 feet of
8 net pay below the perforated interval for a total of
9 34 feet of net pay with an average porosity of 5.1
10 percent, or 173.4 porosity feet.

11 Q Any other comments on Exhibit 4, at this time?

12 A I might point out that if the standard porosity scale
13 had been used, the average porosity would have been
14 3.6 percent.

15 Q Will you refer to Exhibit Number 5 now, and tell us
16 what it represents?

17 A Exhibit 5 is the bottom hole pressure for the field
18 versus the field's accumulated production. The vertical
19 scale on the left-hand side is the bottom hole pressure
20 and this represents the total production from the field
21 from both wells.

22 I should point out that there is very little
23 production represented by this graph attributable to the
24 Pubco well because it was completed at a point where
25 the arrow is shown on the graph.

1 Q The middle of the graph?

2 A Yes.

3 Q The vertical arrow pointing upward?

4 A Yes. Point Number 1 in the upper left-hand corner
5 represents the original bottom hole pressure of 4,800 PSI
6 which was taken from the drill stem test of the Harding
7 Number 2.

8 With the buildup of pressure in the Harding well,
9 the pressure reached 4,185 PSI in two hours, and 4,188
10 PSI in 12 hours, and continued at 4,188 PSI for the
11 remainder of the 48 hour test.

12 Point Number 3 was taken May 15, 1972 and showed
13 an accumulated production of 23,233 barrels of oil.
14 This represented all that had been produced from the
15 Shipp Number 1.

16 On the Pubco Shipp Number 2, the pressure obtained
17 was 3,473 PSI and the maximum pressure was obtained in
18 10 minutes on the chart and continued at 3,473 PSI for
19 the remainder of the test and that was the maximum
20 pressure obtained..

21 Point Number 4 was taken June 15, 1972, at a point
22 of 38,475 barrels of oil which represented accumulated
23 production. This pressure point recorded a maximum
24 bottom hole pressure of 3,035 PSI and it was reached
25 in 12 minutes. The pressure of 3,035 continued for the

1 remainder of the 12 hour shut-in period.

2 Point Number 4 included 2,662 barrels of oil
3 produced from the Pubco Shipp Number 2 during the
4 completion procedure.

5 On the bottom of the Exhibit is a map of both of
6 the wells. At the center of the circle is the Harding
7 Shipp Number 1 and at the edge of the circle is the
8 Pubco Shipp Number 2. This shows the distance between
9 the two wells as being 1,120 feet.

10 In my opinion, it is logical to infer from the
11 graph that effective drainage did occur over this distance
12 of 1,120 feet. From the circle the radius we obtained
13 was an area of 90.4 acres which, in our opinion,
14 represented that the well will drain at least 90.4 acres.

15 So, in conclusion, I would like to make these
16 points. One, that there was a severe pressure loss of
17 1,767 pounds in the Pubco Shipp Number 2 which resulted
18 primarily from the production from the Harding Shipp
19 Number 1. Number two, that communication apparently
20 exists in the Strawn formation between these two wells.

21 Number three, that the shape of the curve is the
22 shape of a normal pressure decline curve. Number four,
23 that we have here effective drainage in excess of
24 1,020 feet -- or in excess of 90.4 acres.

25 I would like to point out, at this time, that while

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1 we were completing our well on June 10, 1972, we started
2 flowing our well at a rate of 758 barrels of oil per
3 day with a tube pressure of 700 PSI. At the same time,
4 the Harding Shipp Number 1 had a pressure of 700 PSI.
5 The next morning, the Harding pumper came over to our
6 rig where we were working and asked us if we had any
7 idea what happened to the well. We asked him what
8 happened and he said it lost 50 pounds of pressure
9 overnight. After we checked the pressure, we knew the
10 pressure had declined from 700 pounds to 650 pounds
11 overnight.

12 Of course, our reply to this was that we had
13 completed our well and it was draining oil from the
14 same formation.

15 Q Anything else at this time, with reference to Exhibit 5?

16 A I believe that's all.

17 Q Now, if you will refer to what has been marked as
18 Exhibit 6 and explain what that is.

19 A Exhibit 6 is a report from Core Laboratories, Inc. on
20 the core analysis of the cores cut from the Pubco Shipp
21 Number 2. The first core is from 11,440 to 11,481 and
22 core number 2 is from 11,481 to 11,491. The report
23 gives an analysis on the interval from 11,440 to 11,491.

24 The second sheet of this Exhibit is a summary
25 of their findings. You will notice there that it is

1 indicated that there is 21.9 feet of pay which was
2 included in the averages for the pay porosity and this
3 21.9 feet occurred at an interval of 11,440 to 11,467.
4 The top ten feet of the pay zone was not cored and the
5 average porosity over 21.9 feet was determined to be
6 6.0 percent. As I pointed out previously, the average
7 sidewall neutron porosity over the cored pay interval
8 was 5.92 percent.

9 The other significant factor I would like to point
10 out is the calculated maximum gas drive recovery of 30
11 barrels an acre-foot. When we received the report, we
12 felt this was low and after doing some calculations,
13 on 80 acres, we were definitely concerned enough to take
14 bottom hole pressures of the formation and have the
15 samples analyzed at the laboratory and this will be our
16 next Exhibit.

17 Q You are referring to Exhibit Number 6-A?

18 A Yes, sir.

19 Q If you will explain that, please.

20 A Exhibit Number 6-A is a summary of the reservoir
21 sample analyses performed by Core Laboratories, Inc.
22 The well was sampled and this bottom hole sample was
23 obtained at a mid-point in the pay zone at a depth of
24 11,449 feet on June 19, 1972. At that point, the
25 bottom hole pressure was 3,033 PSI and the accumulated

1 field production, 38,475 barrels of oil. This summary
2 presents the comparison between 80 acre spacing and
3 160 acre spacing utilizing the data from the fluid samples
4 and also from the previous core analyses. The first
5 figure shows an average porosity of 6.3 percent. This
6 was determined from the sidewall neutron porosity log
7 that I have previously mentioned. The next figure I
8 would like to point out is the 25.0 percent average
9 interstitial water saturation percentage. I will now
10 skip down to the 16.76 percent ultimate oil recovery,
11 percentage of oil in place.

12 These two figures, the 25 percent for the average
13 interstitial water saturation and the 16.76 percent
14 for ultimate oil recovery were calculated using the
15 pressure data and the curves from the Strawn limestone
16 reservoir. We felt these were applicable and by these
17 and using the fluid data obtained from our Shipp Number
18 2 Well and the bottom hole samples, these factors were
19 determined.

20 The oil formation volume was determined to be
21 1.642 and the original oil in place for 160 acre spacing
22 was 1,071,568 barrels of oil.

23 For 80 acre spacing it was 535,783 barrels of oil.

24 The ultimate recovery for 160 acre spacing was
25 179,630 barrels and for 80 acre spacing it was 89,815

1 barrels. The ultimate oil recovery on barrels per
2 acre-foot was determined to be 37.4 in each case.

3 The ultimate gas recovery was 953,577 MCF for
4 160 acre spacing and 476,788 MCF for 80 acre spacing.

5 The total primary producing life for 160 acre
6 spacing was 11.8 years and for 80 acre spacing it was
7 5.9 years. The primary producing life was taken from
8 the economic limits of barrels of oil per day from the
9 reservoir and a pressure of 500 PSI to arrive at that
10 figure.

11 In arriving at the figure, it was assumed that
12 productivity would decline in accordance with the effect
13 of increasing reservoir gas saturation or oil permeability.

14 I have reviewed all of the Core Laboratory reports
15 and determined them to be accurate and correct.

16 Q Now, based upon this information, do you think -- you
17 just said that you determined them to be accurate and
18 correct?

19 A Yes.

20 Q Based upon this information, do you think the volumetric
21 calculations are correct?

22 A Yes.

23 Q As reflected on Exhibit 7?

24 A That's right. Exhibit 7 shows the computation of the
25 recoverable oil reserves from the Humble City-Strawn Pool

1 using the basic data as used in the computations
2 already presented and established. The average porosity
3 used was 6.30 percent which was the porosity found on the
4 Pubco well with an average net pay of 30 feet. The
5 water saturation was 25 percent and the recoverable
6 factor 16.76 percent.

7 The formation volume factor of the original bottom
8 hole pressure was 1.642. The calculations show the
9 original recoverable oil in barrels per acre-foot and
10 according to the formula it was determined to be 37.4
11 barrels of oil per acre-foot which, of course, is the
12 same figure that the Core Laboratories determined.

13 Q Based upon the computation which you have just gone
14 through relating to recoverable oil, did you then make
15 a study of the economics with reference to the proposed
16 spacing units, that is, with respect to 80 acre spacing
17 and 160 acre spacing?

18 A Yes, I did.

19 Q And that study is reflected on Exhibit 8?

20 A That is correct.

21 Q Would you explain that, please?

22 A Exhibit 8 is a tabulation of the economics for the
23 Humble City-Strawn Pool, comparing 80 acre spacing to
24 160 acre spacing. Under revenue for an average well,
25 an 80 acre well would produce 89,815 barrels of oil,

1 a figure which has already been established, at \$3.56
2 per barrel plus 476,788 MCF of gas per well at \$0.25
3 per MCF.

4 We included the gas economics in the computation
5 because Phillips is now laying gas lines to the lease
6 and contracts have been signed and gas sales should
7 begin sometime within the next week.

8 So, this came up to a total revenue under 80
9 acre spacing of \$438,938.

10 Under 160 acre spacing, the average well would
11 produce 179,630 barrels of oil per well at \$3.56 per
12 barrel plus 953,577 MCF of gas for a total revenue of
13 \$877,877. Subtracting the royalty and taxes, we have
14 a total revenue under 80 acre spacing per well of
15 \$325,472. Under 160 acre spacing, we have a total of
16 \$653,946.

17 The next item is expenses, which is self-explanatory.
18 Total expenses on an 80 acre well would be \$295,400 and
19 for a 160 acre well, the total expenses would be \$330,800.

20 The next item is the net profit resulting from
21 subtracting the total expenses from the total revenue
22 and the net profit for an 80 acre well would be \$30,072
23 and for a 160 acre well it would be \$320,146.

24 The profit to investment ratio, is 0.12 on 80 acre
25 spacing and 1.27 on 160 acre spacing.

1 Down at the bottom of the Exhibit is a note that
2 the analysis does not consider any dry holes that may
3 be drilled. Estimated dry hole cost if \$162,000.

4 On the basis of these calculations, a producer on
5 160 acre spacing will support two dry holes while it
6 will take five times the net profit on 80 acre spacing
7 to support one dry hole.

8 I would like now to refer back to Exhibit 1 in
9 connection with our economics and I will state again for
10 the purpose of comparison, that the rate of recovery
11 for 80 acre spacing is calculated at 89,815 barrels,
12 while the recovery for 160 acre spacing was calculated
13 at 476,788 barrels.

14 If you would refer to Exhibit 1, the wells are
15 colored in green to the NW of the Pubco Well and the
16 Harding Well. In Sections 4, 5, and 6 of Township 17
17 South, Range 37 East, versus the wells in Section 5 in
18 the NW corner, shows the total recovery from the B'
19 zone, the same zone that the Harding and Pubco wells are
20 in, to be 60,297 barrels. This won't appear on your
21 graph because our draftsman forgot it.

22 The next well in Section 5, in the NE/4 of Section
23 5, shows a total of 58,751 barrels of oil recovered.

24 The next well in the NW/4 of Section 5 shows a total
25 recovery of 19,647 barrels of oil. These three wells

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1 have all been plugged and abandoned.

2 The well in the SE/4 of Section 32 shows an ultimate
3 recovery of 421,768 barrels. This ultimate recovery
4 was calculated from extrapolation of production history.
5 However, it has to be pointed out that recovery from the
6 well is from both the B' and the C zone, so we do not
7 feel that it is really comparative with the B zone
8 wells, further up on the map.

9 In Section 31, close to the center, we have a well
10 there in the NW/4, in the SE corner of the NW/4, which
11 had produced a total of 17,040 barrels of oil before it
12 was abandoned. Then, about two miles north, in Section
13 19, 37 East, 16 South, in the SW/4 of the Section, we
14 have a well which produced over 100,000 barrels from
15 the B' zone. The well produced a total of 132,597
16 barrels of oil. This well is still producing at a rate
17 of 7 barrels a day.

18 To the left of that, just across the Section line
19 in Section 24, 36 East, 16 South, this well produced a
20 total of 4,115 barrels of oil from the B' zone. North
21 of that, in Section 18, the SE/4 of Section 18, we have
22 a well which is still producing 29 barrels of oil per
23 day.

24 My point here is we have only one well producing
25 from the B' zone which has produced in excess of 100,000

1 barrels of oil. This would indicate that these would
2 be economic failures in as much as one well on 80 acre
3 spacing would produce, as we have calculated, 89,815
4 barrels of oil. It is easy to see how four good wells
5 would be required to support one dry hole and these
6 other wells I have been talking about, must be economic
7 failures.

8 In conclusion, I would like to make three points.
9 First, it is our opinion that one well will effectively,
10 efficiently, and economically drain 160 acres. Two,
11 it is my opinion that 160 acre spacing will permit the
12 drilling of economic wells whereas we have presented
13 information here establishing the fact that 80 acre
14 spacing will result in the drilling of unnecessary and
15 uneconomic wells. Three, it is my opinion that 160 acre
16 spacing development of the Humble City-Strawn reservoir
17 will insure the operators that they can obtain profits
18 even though some dry holes will undoubtedly result,
19 regardless of the spacing which may be chosen.

20 Q Do you have anything further, Mr. Sanders?

21 A No, sir.

22 MR. SPERLING: I would like to offer our Exhibits
23 1 through 8.

24 MR. UTZ: Exhibits 1 through 8 will be entered
25 into the record of this case.

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(Whereupon, Pubco's Exhibits 1 through 8
were entered in evidence.

MR. SPERLING: I have nothing further.

* * * * *

CROSS-EXAMINATION

BY MR. HINKLE:

Q Mr. Sanders, I refer you to your Exhibit Number 5, I
don't believe that you testified how long your well
Number 2 was shut-in at point number 4. Do you know
how long it was shut-in?

A Yes, 12 hours.

Q Now, in connection with Exhibit 5, I believe you said
that this showed a severe pressure loss?

A Yes, sir.

Q And that this indicated good drainage between the
two wells?

A That is correct.

Q Isn't it also indicative of a limited reservoir?

A Naturally, any reservoir is limited.

Q I mean a small reservoir. Doesn't it indicate that this
is a small reservoir rather than a large reservoir?

A Such could be an indication, however, it also, as I
believe our testimony has indicated, shows that this
is an extremely permeable section in the vicinity of our
well and your well and that such permeability gives real

- 1 good pressure communication between the wells whereas
2 in a real tight reservoir, often times you reach 90
3 to 95 percent bottom hole pressure within the first
4 100 feet from the well bore under producing conditions.
- 5 Q Well, you had this pressure drop when you located your
6 Number 3 well, did you not?
- 7 A No.
- 8 Q You didn't have it at all?
- 9 A No, sir.
- 10 Q You knew it was dropping when you drilled the Number 2
11 well?
- 12 A Yes, we had access to Harding information.
- 13 Q But you didn't take that into consideration in
14 locating your well as close to the Number 1 well as you
15 did?
- 16 A No. I think, as Mr. Causey pointed out, the geology
17 of the situation required that in a new area we locate
18 as close to production as possible within the limits
19 of the statutes of the State.
- 20 Q Referring to your Exhibit Number 8, your economic study,
21 now, doesn't this study that you have made in comparing
22 80 acre spacing to 160 acre spacing, take into consideration
23 or assume that this is a large reservoir?
- 24 A Well, the only assumption we made here is that a 160
25 acre well would have the full 160 acres to develop

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porosities of the qualities we have shown.

MR. HINKLE: I think that's all I have.

MR. UTZ: Any further questions?

(No response.)

MR. UTZ: The witness may be excused.

(Witness excused.)

MR. UTZ: Does that conclude your Case, Mr. Sperling?

MR. SPERLING: Yes.

MR. UTZ: You're on, Mr. Hinkle.

* * * * *

RICHARD F. SPENCER,

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q Will you state your name, residence, and occupation?

A My name is Richard Spencer, I live in Midland, Texas,
and my occupation is an independent consulting geologist.

Q Have you previously testified before the New Mexico
Oil Conservation Commission?

A No, I have not.

Q Would you state, briefly, your educational background
and experience as a geologist?

A I am a graduate geologist of Texas Tech. I have 14 years
experience, including working with Pan American Petroleum.

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1 I am a certified petroleum geologist.

2 Q What companies have you been with prior to becoming
3 an independent consulting geologist?

4 A Well, I stated Pan American, Forester, and I have been
5 self-employed for a year and a half.

6 Q Are you familiar with this area under consideration?

7 A Yes.

8 Q And the pools in the vicinity?

9 A Yes.

10 Q The NE and East Lovington pools?

11 A I am very familiar with them.

12 Q And have you made studies of the well information
13 available in connection with this?

14 A Yes, my partner and I worked the area in some detail
15 sometime after the Pubco Shipp Number 1 bottomed at
16 9,162 feet. After that well was bottomed, my partner
17 and I went to the Pubco Corporation, Oil Corporation, to
18 seek a farm-out because we felt this area was quite
19 representative of the Strawn and other zones.

20 MR. HINKLE: Are the witness' qualifications
21 acceptable?

22 MR. UTZ: Yes, they are.

23 Q (By Mr. Hinkle) Have you prepared, or has there been
24 prepared under your direction, certain Exhibits in this
25 Case?

1 A That is correct.

2 Q And they have been marked?

3 A Yes.

4 Q Referring you to Exhibit 1, what does that show?

5 A Exhibit 1, as you can see before you Mr. Examiner, is
6 just a regional map. This map shows the outlined fields
7 with the Permian Basin area stratographically located.

8 Q Referring you to Exhibit 2, will you explain what that
9 is?

10 A Exhibit 2 is an isopach map of the B' Strawn facies. This
11 is the same zone Mr. Causey referred to earlier, I am
12 referring to the cross-section on the wall.

13 Q What Exhibit is that?

14 A That is Exhibit 3. We concur completely as to the
15 stratographic breakdown of the Strawn formation and
16 this map, Exhibit 2, represents the facies of the B'
17 Strawn within the local area. I might just point out
18 that the wells we have designated on the map, the
19 green designations, represent those wells that have
20 penetrated and have produced from the B' Strawn. The
21 blue designations are wells that have penetrated and
22 produced from the B Strawn bank facies. The orange
23 represents wells produced from the C bank facies.

24 The map is contoured on 25 foot contour intervals.

25 And the map also shows the location of the leases in

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1 in and around the Harding Shipp discovery well in
2 Section 11.

3 Also on this map, is shown an 80 acre checkerboard
4 on all the acreage Pubco has a leasehold interest within
5 the immediate area.

6 I will point out initially that in the SW/4 of
7 Section 11, where the discovery well is located, the
8 Harding Shipp Number 1 well, this well was penetrated
9 from 9,162 feet which was the total depth Pubco reached
10 in this well. This well was deepened from that point
11 down to a depth of 11,861 feet into the Atoka.

12 Under our contract arrangement, farm-out arrangement,
13 we were to deepen this test to a depth where we would
14 be 100 feet below the depth drilled and the acreage was
15 to be designated to the unit, whatever that unit would
16 happen to be, if it was 80 acres, it would be 80 acres.

17 On completion of the initial well, we would have
18 the option to drill a second test and all continuous
19 development would be on a 120 day continuous development.

20 Now, we are here today to set up -- to talk about
21 special pool rules for the Humble City-Strawn Pool
22 including provisions for 80 acre units and assignments
23 of all discovery allowables for the Shipp Well Number
24 1 located in unit K of Section 11, Township 17 South,
25 Range 37 East, Lea County, New Mexico.

1 This pool arrangement on 80 acre spacing would
2 be similar to the Lovington NE and Lovington East field.

3 Q They are on 80 acre spacing; are they not?

4 A This is correct. In our initial discussions with
5 Pubco, this was taken into consideration and it was
6 felt that these would be the probable field rules for
7 the Humble City-Strawn pool.

8 Q Did your farm-out agreement provide for 80, 40, 160
9 acre spacing, whatever spacing unit was determined by
10 the Oil Conservation Commission?

11 A This is correct.

12 Q But the checkerboard which you show on Exhibit 2 indicates
13 the checkerboard prevailing under the farm-out agreement,
14 if the checkerboard showed 80 acre spacing and the Oil
15 Conservation Commission approved 80 acre spacing; is that
16 right?

17 A That is correct.

18 Q Now, I believe you said that you agreed with the cross-
19 section which Pubco has presented, it is the same as you
20 are presenting here?

21 A Yes.

22 Q Do you, by these different zones, indicate this is a
23 separate stratigraphic trap within the Strawn formation
24 or that there is communication between these two zones?

25 A In focusing our attention now on Exhibit 3 and Exhibit 4,

1 they are exactly the same wells as Mr. Causey showed
2 on his cross-section with exactly the same designations.
3 I do definitely agree with Mr. Causey in that this is
4 a Strawn formation here. There are probably -- more
5 likely there is vertical separation between each of the
6 stratigraphic units, the B', B, and C, although these
7 units occur within two to three hundred feet intervals,
8 and were, more than likely, deposited under similar
9 environment. What we are saying here -- reaching back
10 here to Exhibit Number 2, you can see that these zones
11 are very erratic, of a very erratic nature, both
12 horizontally and vertically and you can see by the
13 blue designation on the map over here, that the B bank
14 facies is coming back to the south and west. This facies
15 disappears -- doesn't disappear, but the rock
16 characteristics change and you can see a number of dry
17 holes that have been affected in Sections 16, 17, and
18 20 in 16 South, 37 East, and the wells down here in
19 Section 19 and Section 24.

20 What I am saying here, is that each one of these
21 units, each one of these stratigraphic units, right in
22 here, affect the individual stratigraphic trap with no
23 particular emphasis being placed on the present day
24 structure.

25 The 160 acre spacing brought out by Pubco more than

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1 likely would have caused some of these zones not to be
2 drained. As you can see from the dry holes in Sections
3 19 and 20, the three producing zones within the total
4 Strawn unit are independent of one another. In essence,
5 what I am saying, is that the Strawn being deposited from
6 the same environmental deposition, does have, within it,
7 individual stratigraphic traps that are very erratic
8 and very difficult to find and this is why Pubco came
9 so close to the initial discovery well. You can pick
10 up new zones, productive, stratigraphic zones, that
11 come and go over a very short period of time.

12 For instance, in the cross-section, A and A',
13 between these two wells, the well right here (indicating)
14 produces from B' facies and this well (indicating)
15 produces from the C facies. These two wells are only
16 2,550 feet apart and it is very possible with 160 acre
17 spacing, that one of those zones may have been missed,
18 especially the C zone.

19 Q You could have a situation where, if you had 160 acre
20 spacing, you might have one producing well and a good
21 part of the 160 acres might be barren or have no
22 production at all?

23 A Absolutely. You can see this in Section 20, 16 South,
24 37 East. Section 20's producing well is located down
25 in the SW/4 of Section 20 and that particular well is

1 producing from the B facies and it is surrounded by
2 dry holes. There are dry holes in Sections 29, 30,
3 19, and the one in Section 20. That particular well
4 has produced over 900,000 barrels of oil on 160
5 acre spacing and it is possible that that 900,000 barrels
6 of oil might have been missed.

7 Now, granted, this is not in the same zone and it
8 may be within 25 or 30 feet from the producing interval
9 of the Harding Shipp Well, but it is in the same suite
10 of rock deposits and under the same depositional
11 environment which we hope to find productive in the
12 general area of the discovery well.

13 Q I believe you mentioned previously, that your partnership
14 is Spencer and Hudson and you mentioned the fact that
15 you secured the farm-out from Pubco, what is your
16 relationship to the Harding Oil Company?

17 A Our relationship has been that we are geologists, and
18 we generate drilling prospects for companies such as
19 Harding. We have a good working relationship with
20 Harding. We offer consultation advice which we have
21 done from time to time over the last year, and this is
22 basically our relationship, primarily that of a
23 consultant.

24 Q You have made a deal with Harding Oil Company to
25 develop this area on the acreage you will obtain as a

1 farm-out?

2 A From our farm-out agreement which was consummated on
3 November 5, 1971, with the Pubco Corporation. We later
4 got approval from the Pubco people to reassign our
5 rights to the Harding Oil Company and Harding assumed
6 our obligations and reentered this well and fulfilled
7 our obligations that we had under the contract.

8 Q So they are going ahead and performing in accordance
9 with the contract?

10 A This is correct.

11 Q Do you have anything else that you would like to
12 discuss?

13 A I would just like to point out, from a geological
14 standpoint here, that you can see, as I pointed out
15 before, in the SE/4 of Section 11, Pubco's two wells,
16 are as close as they legally can be. Also, they are
17 drilling the Number 3 well up in the NW/4 and our Number
18 2 well is in the NW/4.

19 This means there are four wells clustered together
20 and any well that would be drilled beyond these four
21 wells would be a considerable step out with 160 acre
22 spacing. Backing up to the well in Section 19, how
23 hazardous that would be as to picking up these individual
24 zones that might be carrying substantial amounts of oil.
25 We might not find these zones as a result of this wide

1 step out and I believe that is primarily what I would
2 like to say here. There is no real basis on which to
3 say how large this field will be. From a geological
4 standpoint there is no immediate control over this
5 immediate area, the only point of control we have is
6 in Section 8 and these wells back here (indicating) in
7 the Lovington East pool.

8 In Section 11, we had one point of control with the
9 Pubco Number 2 well and because of the geological and
10 engineering datum that was withheld from us, there was
11 no way of telling just how large the pool might be.

12 The datum certainly points out the risk factor by
13 the nature of the deposition of the two cross-sections.
14 These show this is a risky area and there are zones
15 that likely could be missed by wide spacing in the area.

16 Q If the geological information as shown in Exhibit 2 is
17 correct, it would be a limited field as far as the area
18 extending to the north and south; would it not?

19 A This is true. Referring back to Pubco's map, you will
20 recall that the area went beyond the zero isopach line
21 and their configuration was not exactly the same as ours.
22 However, there was no way of telling how large the
23 field might be. However, it is our hope that with proper
24 development, we will be able to pick up these other
25 zones, these other thin zones that could be very

1 elusive and hard to find and that oil may be missed on
2 any other spacing arrangement.

3 MR. HINKLE: That's all I have on Direct.

4 MR. UTZ: Any questions?

5 * * * * *

6 CROSS-EXAMINATION

7 BY MR. SPERLING:

8 Q Mr. Spencer, would you indicate which of the three
9 areas that you have referred to, B, B' and C, appear
10 to have the greatest areal extent insofar as your
11 studies have shown?

12 A The greatest areal extent as far as continuity is
13 concerned is B', by virtue of the wells colored in green,
14 but as far as reserves of one well, the one located down
15 here (indicating) surrounded by dry holes is out of the
16 C zone. It has produced in excess of 900,000 barrels.

17 From a reserve standpoint, the blue would be the
18 greatest and this well could have easily been missed on
19 a 160 acre basis.

20 Q Did you consider development of the East Lovington Pool
21 on 160 acre spacing risky?

22 A I suspect that 80 acre spacing would have developed and
23 drained what they would have on 160 acres.

24 Q Do you know what did develop and drain?

25 A Well, this will come in further testimony.

- 1 Q Have you made calculations which would indicate to you
2 the area extent which would be necessary to produce
3 900,000 barrels?
- 4 A No, but that will come, I believe, in later testimony.
- 5 Q Do you have an opinion as to the areal extent around
6 the Getty-Monty Number 1?
- 7 A The only thing I could show you here would be the
8 development pattern around these wells appear in
9 Sections 17, 16, 20 and 23. These are producing wells
10 with one dry hole.
- 11 Q Wouldn't you have to have an area greater than 160 acres
12 in order to justify that volumetric production?
- 13 A It would depend on the vertical extent.
- 14 Q Have any studies that you have seen or datum that you
15 have seen, indicated the vertical extent of any of these
16 zones?
- 17 A You can certainly see from this (indicating) that this
18 area could easily have been missed.
- 19 Q Do you feel the drilling area is in excess of 160 acres
20 here (indicating)?
- 21 A I couldn't say.
- 22 Q At least 160 acres?
- 23 A At least 80 and maybe 160 at most.
- 24 Q Now, you have referred to the farm-out agreement between
25 Pubco and your partnership, isn't it true that the

1 agreement contemplated not only 80 acre spacing, but
2 also 160 acre spacing and as high as 320 acres?

3 A This is correct.

4 Q So we are not talking about contract provisions, limiting
5 the acreage to 80 acres?

6 A That's correct. We initially talked with Orin Crane
7 and he was later replaced by Dale Harrison and we talked
8 about 80 acre spacing in these two fields, however, we
9 felt it would not be good business to draw up a contract
10 that would not include 160 and 320 acre spacing.

11 Q You were really talking about 160 acres, were you not?

12 A No, we weren't. We could not have been talking about
13 160 acres. Based on what you see up here (indicating)
14 we didn't rule it out up here (indicating).

15 Q You spoke about the difficulties in finding these other
16 possible producing zones within the Strawn and the
17 possibility of missing them on a 160 acre basis; isn't
18 that true? From a volumetric standpoint, isn't it true
19 that you might have geological success so far as locating
20 one of these was concerned and, at the same time, have
21 economic disaster?

22 A This is very true, but I think in answering that
23 question, if you look at the Pubco development, you will
24 see the proximity to this well here definitely points
25 out they considered the economic potential of the area,

- 1 but certainly considered the risks involved here, and
2 also, the other advantages in the way of additional
3 zones, that I tend to believe extend out of this area.
- 4 Q Do you think 160 acre spacing eliminates the development
5 of these other zones?
- 6 A I think it would be hazardous with 160 acre spacing. We
7 feel that the dry hole here (indicating) would have
8 prohibited us and Pubco from developing other locations
9 such as these (indicating). In Section 16, you will see
10 the dry hole in the SW/4, and then again in Section 19
11 you will see a dry hole in the SW/4, then again in
12 Section 30 in the NE/4, and then again in Section 29 in
13 the NW/4.
- 14 Any one of these dry holes might have prohibited
15 additional drilling in the area and I tend to think that
16 if additional dry holes had been drilled, some of these
17 additional wells might never have been developed and
18 that would have slowed the Strawn development in the
19 area.
- 20 Q Do you have an opinion as to whether or not one well
21 in this area as it is presently completed within the
22 Humble City Pool would drain in excess of 80 acres?
- 23 A No, I really don't. I believe our engineer will testify
24 to that.
- 25 MR. SPERLING: That's all I have.

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1 MR. UTZ: Any other questions?

2 MR. HATCH: There has been, I believe, reference
3 made to 80 acre spacing in the East Lovington Pool, I am
4 not sure that is correct.

5 Would you have any exception to the Examiner
6 studying compression records to see what the correct spacing
7 is in the East Lovington Pool?

8 MR. HINKLE: I would certainly recommend that.

9 MR. UTZ: We will take administrative notice.

10 (Witness excused.)

11 * * * * *

12 ROY C. WILLIAMSON,
13 was called as a witness and, having been already duly sworn,
14 testified as follows:

15 DIRECT EXAMINATION

16 BY MR. HINKLE:

17 Q Would you state your name and residence?

18 A I am Roy C. Williamson, Jr., president of Bailey,
19 Sipes & Williamson, of Midland, Texas.

20 Q Have you been employed by the Harding Oil Company as
21 a consultant in this case?

22 A Yes, I have.

23 Q Have you previously testified before the Oil Conservation
24 Commission?

25 A I have.

1 Q And have your qualifications as a petroleum engineer
2 been accepted as a matter of record?

3 A Yes, my qualifications are a matter of record with the
4 Commission.

5 Q Have you, since your employment, made an independent
6 study of the Humble City-Strawn Pool?

7 A Yes, sir.

8 MR. HINKLE: Are the witness' qualifications
9 acceptable?

10 MR. UTZ: Yes, they are.

11 Q (By Mr. Hinkle) Have you prepared or has there been
12 prepared under your direction, certain Exhibits for
13 introduction in this case?

14 A Yes, sir, there have been.

15 Q Referring you to Exhibit Number 5, would you explain what
16 this shows?

17 A Exhibit 5 shows the logs from the four wells that were
18 pointed out in Exhibit Number 2. These are located in
19 Sections 16, 17, 20, and 21 of Township 16 South, Range
20 37 East. Mr. Spencer has referred to the fact that the
21 wells in Sections 16, 17, and 20 are producing from the
22 Strawn section, and the well in Section 21 is a dry
23 hole.

24 I would like to direct your attention to Exhibit
25 Number 5 which shows the perforated intervals of pay

1 development for the three producing wells. We can see
2 here that the State C Number 2, which is in Section 17,
3 has a perforated interval. These are all neutron
4 porosity logs. The well in Section 16 is perforated.

5 The well in Section 20 has a longer perforated
6 interval and pay zone.

7 In Section 21, which was the dry hole, we see
8 that the pay has failed to develop and this, again, just
9 points out the fact that we do have very rapid change
10 in porosity and permeability development over very
11 short distances in this field.

12 The three wells that are producing are all producing
13 in excess of 200,000 barrels of oil as of the first
14 of 1972. I might point out that the well in Section 24,
15 is rather spotty with an accumulative production of
16 4,115 barrels of oil. The well in Section 19, the
17 Clinton-Monty State Number 1 shows 113,000 barrels which
18 again, shows the rapid change in the producing
19 characteristics over very short distances. In Section
20 20, we have the Getty well, which has been referred
21 to before and which has produced over 900,000 barrels
22 of oil.

23 Right to the west of it, we have a dry hole and
24 to the SW of it another dry hole. The nearest producer
25 in Section 19, is rather spotty and has produced about

1 15,000 barrels of oil as of the first of the year.

2 Calling your attention down to the Lovington East
3 field, in Section 4 of Township 17, South, Range 37
4 East, we have the Getty State U Number 1 that has
5 produced about 19,600 barrels of oil before being
6 temporarily abandoned and plugged back to the Paddock.
7 In Section 32, we have the Getty State P Number 1
8 which has produced 419,000 barrels of accumulated
9 production as of the first of the year.

10 So we can see that we could have very marked
11 changes in our porosity and permeability development and
12 these wells also exhibited producing characteristics
13 that were very close, one to the other.

14 Q Referring you to Exhibit Number 6, would you explain
15 what that is?

16 A Exhibit Number 6 is a copy of the acoustic log on the
17 Shipp Number 1 well. I have depicted sections here that
18 include what has been determined to be pay sections at
19 short, perforated intervals.

20 I have shown here, and it's a little hard to see,
21 but I have assumed the minimum porosity below which
22 production will not occur as being 4 percent.

23 In other words, we have a 4 percent porosity cut-off
24 line and the average porosity line as exhibited by the
25 sonic log, is approximately 4.8 percent. We understood

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1 that Pubco had cored their Number 2 Shipp, but the
2 information was not available to us, so I needed to make
3 some calculations utilizing porosities that were a little
4 more representative because I felt this one here was
5 low.

6 I utilized the sidewall neutron logs, mainly because
7 they were the best logs available, and they were
8 porosity logs from the wells in Sections 16, 17, and
9 20.

10 In analyzing these logs, I arrived at an average
11 porosity of approximately 8 percent which was used in
12 my calculations. I see now, from the datum that this
13 was probably high by some 25 percent.

14 Q I refer you know to Exhibit Number 7, will you explain
15 that?

16 A Exhibit 7 is a comparison of the reserves calculated
17 by the volumetric method. The fluid samples on this
18 well indicate a bubble point of 2893,000 pounds and
19 an accumulative production of 10,090.

20 On Exhibit 7, bottom hole pressure was again
21 measured and was found to be 4,188 pounds and from
22 eliciting data from the fluid analyses, we were able to
23 determine the formation volume factor that was initially
24 representative of the oil formation and was representative
25 of a pressure of 4,188 pounds.

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1 Utilizing the simplified version above the bubble
2 point I was able to calculate from available data, the
3 amount of stock tank oil originally in place in the
4 reservoir. The figure was calculated to be 741,609
5 barrels of oil. Without having better datum, I just
6 assumed for estimation purposes, that the recovery
7 would be approximately 20 percent and Pubco has shown
8 it to be 16.67 percent, I believe.

9 I might point out two things that might alter the
10 calculations of reserves. It is very possible that, in
11 view of the fact we do have bugular porosity we should
12 have matrix porosity due to the fact that the pressure
13 buildup has been so rapid.

14 It is my feeling that the rapid pressure buildup
15 is probably occurring from the bugular porosity of the
16 reservoir and the pressure measured here probably is
17 pressure contribution from the bugular porosity of the
18 reservoir, as opposed to the matrix porosity.

19 So, if we had a longer shut-in pressure, we
20 might show that the pressure drop was not quite as
21 severe as we have observed here.

22 Also, the fact that we have bugular porosity, I
23 think our recovery factor could possibly be somewhat
24 higher than the standard 20 percent. I think the datum
25 indicates that we have a very limited reservoir and

1 indicates that this field is right in line with what
2 we have seen in the Lovington East and Lovington North-
3 east fields where those reservoirs have indicated that
4 they are somewhat limited in size.

5 Referring back to Exhibit Number 1, I think reference
6 has been made to the three wells in Sections 6, 5 and
7 4 of 17 South, 37 East. These wells are essentially
8 drilled on 160 acre spacing and the well recoveries
9 shown indicate to me, that they are not draining the
10 acreage. We don't know what they are draining because
11 they are all uneconomical wells so it is immaterial
12 whether they are on 40, 80 or 160 acre spacing.

13 They are not draining a very large area and just
14 because you have water spacing, it doesn't mean you can
15 generate more reserves. So I think we need to look at
16 the basic requirements in view of the reservoir
17 characteristics.

18 Referring back to Exhibit Number 7, I think that
19 I mentioned before that the sonic log on the Shipp Number
20 1 indicated 4.8 porosity and the average porosity from
21 Pennsylvanian oil wells, was about 8 percent. I felt
22 8 percent was near right, but was probably high; but
23 on the other hand, 4.8 was low. Anyway, that was the
24 number I utilized on my calculations.

25 Again, I estimated the recovery of stock tank oil

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1 to be placed at 20 percent. Utilizing the original
2 formation volume factor, I made a volumetric calculation
3 of oil in place per acre foot and found it to be 52
4 barrels of oil per acre foot.

5 My calculations of the net pay from the sonic
6 log of the Shipp Number 1 well was substantiated not only
7 by the log, but from the time log which indicated that
8 we do have rock that is more easily drillable here for,
9 I would suppose, greater porosity.

10 I determined from this 46 feet of net pay and I
11 then calculated the recoverable barrels of oil on an
12 80 acre basis and on a 40 acre basis. On a 40 acre
13 basis, the total was 95,000 barrels and on 80 acres,
14 191,000 barrels.

15 Now, if we assume that the average porosity in the
16 area of the Shipp Number 1 well is approximately 25
17 percent too high, and that would be indicated by the
18 Pubco data, that would reduce the 80 acre drainage by
19 25 percent and put it at 150,000 barrels which agrees
20 with the 148,000 barrels figure.

21 So this data indicates that we are dealing with
22 a reservoir that might not be bigger than 80 acres
23 to start with. I hope, for the sake of the operators,
24 that it proves to be larger, but the data on hand to
25 date does not indicate that it should be larger.

1 We could take the 80 acre total and multiply
2 by two and show we would get 400,000 barrels by draining
3 160 acres, but I think the data that has been calculated
4 indicates that we do not have a reservoir that big.

5 I would say that it doesn't really matter and
6 that it is immaterial if you don't have a reservoir
7 larger than 80 acres, you couldn't expect to drain an
8 area larger than 80 acres.

9 Q Is that all you have in connection with Exhibit 7?

10 A I believe so.

11 Q Referring you to Exhibit Number 8, would you explain
12 that?

13 A Exhibit 8 is a study of the economic development. In
14 arriving at item number 1, we utilized \$3.44 per barrel
15 of oil and \$0.22 per MCF of gas. I utilized an average
16 of 1,000 cubic feet per barrel of oil, which is probably
17 a little low.

18 I estimated taxes and operating costs and ran this
19 out mathematically and showed that to pay out for the
20 drilling and preliminary tests, the taxes and operating
21 costs, it would require approximately 90,000 barrels
22 of oil.

23 If we reduced our average porosity to 6 percent
24 instead of the 8 percent, it would show that on 40 acre
25 spacing it would be uneconomical.

1 On 80 acre spacing, I think we probably have a
2 reasonable prospect, we certainly would get our money
3 back, plus some more and changes are that we might
4 develop more reserves by means of two things. One, the
5 recovery might be greater than 20 percent and this
6 would be a major thing that I think we might see. And,
7 also, the pressure that we have measured might be a
8 little higher than we think, at least this is my
9 opinion. Of course, if the pressure is higher, we should
10 show more oil in place.

11 Now, I might mention that the pressure taken in
12 the Shipp Number 1 was after production of some 10,900
13 barrels of oil. At that time, calculations should have
14 been made as to what the volumetric oil in place should
15 have been.

16 Q Do you have any comments with respect to any of the
17 Exhibits introduced by Pubco?

18 A I might make a comment on Exhibit Number 5, their
19 Exhibit Number 5. Again, I believe the location of
20 their well Number 3 would probably be just about on
21 this line (indicating), I'm not sure of that though.

22 This would indicate it would be sharing the
23 drainage area that the Harding Number 1 is sharing and
24 which would indicate that we now have essentially three
25 wells which might be sharing recoverable reserves of

1 150,000 barrels of oil.

2 Q What conclusions have you come up with as a result of
3 your studies in this area?

4 A It is my conclusion that 80 acre proration units would
5 be preferable in developing the field because of the
6 erratic nature of the porosity and permeability. This
7 erratic nature would cause risks in getting dry holes
8 and these risks would escalate very rapidly on 160 acre
9 space outs.

10 The rapid changes would not only affect drainage,
11 but actual pay development. We have said that these
12 wells, in this area, do change very rapidly and we have
13 seen where a well will recover a lot of oil right next
14 to a dry hole.

15 The communication between the Harding well and
16 the Pubco well is obviously very good and I think that
17 the risk that is inherent in this reservoir was exhibited
18 by Pubco in its desire to drill their well as close to
19 the discovery well as they could get.

20 With the risks involved in this reservoir, I
21 probably would have done just what they did, get as close
22 to the producer as I could because I don't want to drill
23 a dry hole. I would rather share the reservoir with
24 someone than get a dry hole.

25 Q Do you have any further conclusions?

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- 1 A You have good rock development in the reservoir and
2 the economics of 80 acre spacing will be very adequate.
3 If you did not have good rock development the fact
4 you drilled on 160, or 320 acre spacing would not help
5 you economically because, with poor rock development,
6 you are not going to be able to drain a very large area
7 anyway.
- 8 Q Is it your opinion, then, that the adoption of temporary
9 80 acre spacing will be in the interest of conservation,
10 of hydro carbons and the prevention of underground
11 waste?
- 12 A Yes, sir.
- 13 Q Would adopting 160 acre spacing protect correlative
14 rights?
- 15 A I would say no, because you might miss, completely miss,
16 the development of a porosity or permeability zone.
- 17 Q Do you have anything else that you would like to add?
- 18 A I think that possibly the Exhibit of Pubco, Pubco's
19 Exhibit Number 5, that indicated bottom hole pressure
20 that we do see that apparently the pressure is beginning
21 to turn or curve and this could possibly indicate that
22 we are seeing some pressure coming out from the matrix
23 of the reservoir which might support the fact that we
24 have a little higher pressure than we think we do, I
25 certainly hope so, because that would mean there would

1 be more reserves to be produced.

2 MR. HINKLE: We would like to offer Exhibits 1
3 through 8.

4 MR. UTZ: Exhibits 1 through 8 will be entered
5 into the record of this case.

6 (Whereupon, Harding's Exhibits 1 through 8
7 were entered in evidence.)

8 MR. UTZ: Any questions?

9 * * * * *

10 CROSS-EXAMINATION

11 BY MR. SPERLING:

12 Q Mr. Williamson, referring again to Exhibit Number 2,
13 I believe it is, and the three producing wells that
14 you referred to and the one dry hole which are in the
15 Lovington Northeast Pool area, do you have an opinion
16 as to the extent of the area that those wells are
17 draining and have drained?

18 A Yes, I have. Look at this (indicating) and it is my
19 opinion that those wells are very capable of obtaining
20 a production that they had exhibited from 80 acre
21 spacing.

22 Now, this line will show what the pay interval is.
23 In other words, there has not been sufficient testing
24 in those wells to indicate how far the pay zone extends
25 below the pore formation.

1 So, by referring to Exhibit 5, we can see the
2 perforated intervals are in the top of the indicated
3 porosity zone.

4 In considering the volume of oil produced from some
5 of those that have been drilled on 80 acres -- well, I
6 think the highest -- well, I don't think we are looking
7 for 900,000 barrels -- naturally, we will be looking for
8 it.

9 Q Even on 160 acre spacing, it could occur?

10 A What about 160 acres?

11 Q It could occur on 160 acre spacing?

12 A Oh, yes.

13 Q Now, if this -- if your conclusion concerning the extent
14 of this reservoir as possibly being confined to 80 acres
15 is true, should not the next step be taken in order to
16 confirm whether it is or not?

17 A If we determine this from subsequent pressures, I,
18 personally, if I were an operator spending my money,
19 wouldn't drill another well anywhere here before I got a
20 large pressure buildup. I feel it is a greater risk
21 stepping out on a 160 acre basis because you are very
22 likely to miss part of the reservoir these wells are
23 producing from.

24 This well was not taken to the Strawn zone by Pubco,
25 obviously they did not feel the well justified going any

- 1 deeper to the Strawn.
- 2 Q I believe you already reduced your volumetric calculations
- 3 some 25 percent?
- 4 A Yes.
- 5 Q Now, in arriving at your net pay figure, how did you
- 6 conclude there were 46 net feet of pay when there seems
- 7 to be an indication of a maximum of 34 feet?
- 8 A I took all the net pay above the 4 percent porosity
- 9 cut off which was confirmed by the log on the Shipp
- 10 Number 1.
- 11 Q Would you consider this core information to be more
- 12 reliable?
- 13 A I would suppose it would be, yes.
- 14 Q What kind of scale did you use for the 4 percent cut off
- 15 in porosity?
- 16 A What kind of scale?
- 17 Q Yes, porosity scale.
- 18 A I calculated the matrix velocity for the reservoir and
- 19 used the time equivalent equation to calculate what 4
- 20 percent would be.
- 21 Q Now, if I understood your testimony correctly, I believe
- 22 you suggested temporary 80 acre spacing. What exactly
- 23 do you mean by that?
- 24 A Well, as I understand it --
- 25 MR. HINKLE: That is what the Application is for,

1 temporary.

2 Q (By Mr. Sperling) Well, are you suggesting the
3 possibility that, at some time in the future, this be
4 expanded to 160 acre spacing?

5 A I have no feel for that, as far as I am concerned,
6 permanent 80 acre spacing rules could be adopted.

7 Q Do you think that Pubco's Exhibit 5 shows that the
8 Harding well is draining in excess of 80 acres?

9 A It shows 90.4 acres.

10 Q Do you agree with that?

11 A If we assume the reservoir is homogeneous within the
12 circle, yes. If it is not homogeneous, we could have a
13 limited reservoir that is smaller than 90.4 acres.

14 Q But you don't have any evidence of that?

15 A No, there is none in existence.

16 Q Did your studies indicate the presence of fractures
17 insofar as these zones are concerned in the Strawn and
18 possible communication between them?

19 A I have no data as to fracture conditions in the
20 reservoir, perhaps the core analysis would show it.

21 Q Mr. Williamson, on your Exhibit Number 2, I notice you
22 have a location shown to indicate your Number 2 well
23 in Section 11?

24 A Yes.

25 Q What are your plans as to the drilling of that well?

1 A I will defer that to the operator.

2 MR. HINKLE: The next witness will cover that.

3 Q (By Mr. Sperling) Do you know about the Pubco well
4 drilling, the well just to the north of your location?

5 A I was told that it was around 9,000 feet, that's all
6 the information I have had to date.

7 MR. SPERLING: I have no further questions.

8 MR. UTZ: Any other questions?

9 (No response.)

10 MR. UTZ: If not, the witness may be excused.

11 (Witness excused.)

12 * * * * *

13 JAMES JUSTICE,

14 was called as a witness and, having been already duly sworn,
15 testified as follows:

16 DIRECT EXAMINATION

17 BY MR. HINKLE:

18 Q State your name, residence and position, please.

19 A My name is James O. Justice; my residence in in Dallas,
20 Texas; and I am chairman of the board and chief executive
21 officer of Harding Oil Company.

22 Q What is the relationship between Harding Oil Company
23 and the Spencer and Hudson partnership?

24 A We have a consulting arrangement and we work with them
25 on a number of different prospective drilling opportunities

1 and took from them, at their recommendation, the
2 Pubco farm-out that had been made to them previously in
3 November of last year.

4 Q And you have assumed responsibility for complying with
5 the Pubco contract?

6 A Yes.

7 Q And Harding Oil Company deepened the Pubco well and
8 made the discovery?

9 A Right, there was a good opportunity from three standpoints,
10 one, the potential of the reservoir; two, the opportunity
11 for developing acreage significant to us, and third,
12 the opportunity for return.

13 Q State, briefly, how the Harding Oil Company is operated.

14 A Basically we obtain prospects from consulting geologists
15 of which Spencer and Hudson are major contributors. We
16 offer these through an investing public.

17 Q Have you given notice to the public company of your
18 attention of drilling the Number 2 well in the time
19 provided by the farm-out agreement?

20 A Yes.

21 Q What procedure are you following?

22 A Shortly after completion of the Shipp Number 1 well
23 we prepared our S-10 registration and submitted it to
24 the Security and Exchange Commission for their review.
25 There is a 120 day clause associated with this and we

1 recognized that because of the time this would be
2 difficult to achieve.

3 Q Have you filed with the Security and Exchange Commission,
4 a plat or plans for development not only of the Number
5 2 well, but of the acreage in general?

6 A Yes, in our initial registration with the Security and
7 Exchange Commission, we filed for the development of the
8 acreage on 80 acre spacing if it were oil and 320
9 spacing if it were gas.

10 This action was taken by us not only from the
11 recommendations of the consulting geologists, but also
12 on our own house investigation. We felt that, as a
13 result of examining the area, from the way it drilled
14 and the way it drained, that producing on 80 acres
15 presented the optimum kind of spacing for the area. It
16 was on that judgment and on that basis that we went
17 ahead with the 80 acre proposition.

18 Q Now, if the Commission should approve 160 acre spacing,
19 would this be difficult for you concerning your
20 Application with the Security and Exchange Commission?

21 A There would be several adverse effects, a significant
22 time delay would be associated with it, and it would
23 require refinancing.

24 It would also require changing the ground rules
25 under which the offers would be made. This would be a

1 difficulty not only with the Security and Exchange
2 Commission, but I think it would put our contract in
3 jeopardy so far as our ability to meet the time require-
4 ments of the contract are concerned.

5 Q Do you have any intention after drilling the Number 2
6 well, of drilling additional wells in the area?

7 A Yes, we have applied -- we have made application to drill
8 two additional wells. These applications are being held
9 pending the outcome of this hearing.

10 Q Can you tell the locations of those wells?

11 A The locations are shown on Exhibit 2, and they are
12 designated the numbers 3 and 4 wells. There's one to
13 the east and one to the northwest.

14 Q And, if 80 acre spacing is adopted, you intend to
15 proceed on the basis outlined and drill these wells?

16 A Yes, that is correct.

17 Q From all the information which has been available to
18 you and from employing consulting firms, have you formed
19 any conclusions as to how the area should be developed?

20 A Yes.

21 Q From a conservation standpoint?

22 A Yes. First of all, we feel the original assessment
23 and conclusions have been confirmed.

24 Secondly, we feel that it would be in the interest
25 of our investors to continue on 80 acre spacing.

1 Third, we feel that in the interest of conservation,
2 it will effectively and efficiently drain the acreage
3 based again on the assessments obtained from the
4 consulting engineers.

5 Fourth, we feel that it will also preserve the
6 correlative rights of others in the area, that 160 acre
7 spacing, in our view, would jeopardize.

8 Q Have you any objections, or any favorable comments from
9 any operators in the area concerning your Application for
10 80 acre spacing?

11 A We have gotten letters of support from several people in
12 the area; Mr. H. L. Brown, Atlantic Richfield, and
13 I think, probably one other who may have communicated
14 by telegram or letter supporting 80 acre spacing.

15 Q Are these from owners who have acreage in the area that
16 are supporting your Application?

17 A Yes, sir.

18 Q Do you have anything further?

19 A Nothing other than -- I realize these business aspects
20 are not really germane to the Commission's deliberations,
21 nonetheless, I wanted to take the opportunity to point
22 them out because, in our perspective, they are
23 significant factors that influence our operations. We
24 feel that from a business aspect there is good and
25 sufficient reason for continuing on 80 acre spacing for

1 the reasons that have been outlined here today and
 2 which support our initial judgment in making this
 3 particular arrangement.

4 MR. HINKLE: We understand there have been letters
 5 or telegrams sent to the Commission.

6 MR. HATCH: There is a telegram from Pennzoil, a
 7 telegram from Atlantic Richfield, both in support of Harding's
 8 Application. There is also a letter from Texas Independent
 9 Petroleum supporting Harding Oil Company's Application.

10 MR. HINKLE: I believe that's all we have.

11 MR. UTZ: I would like to ask a question in regard
 12 to the Number 2 well. How much longer do you have to get
 13 the approval of the Security and Exchange Commission to
 14 complete the well?

15 THE WITNESS: We have made application and expect
 16 comment this week from them.

17 MR. UTZ: Any other questions?

18 * * * * *

19 CROSS-EXAMINATION

20 BY MR. SPERLING:

21 Q Did you have separate registration for each of these
 22 prospects, Mr. Justice?

23 A We have filed separately on the first and second, on
 24 the subsequent ones, we might not.

25 Q What are the economic risks to Harding under your

1 arrangement?

2 A We have economic risks in terms of the cost of the
3 acreage that we are dealing with here, along with the
4 initial acquisition risk. We have legal fees and risks
5 in terms of meeting our contract obligations. Some of
6 the risks are more than economic.

7 Q Well, assuming the cost of the well to be \$300,000, how
8 much of that represented investment by Harding?

9 A I can't give you the precise figure off the top of my
10 head, but our investment in that would be a small
11 percentage of the total investment.

12 Q What is your participation in production?

13 A We will participate in production by less than 20
14 percent.

15 Q So, in effect, the wells are being paid for by your
16 investors?

17 A Yes.

18 Q And you receive a 20 percent interest without a
19 substantial investment in the cost of drilling the well;
20 is that a fair statement?

21 A I think that's a fair statement, yes.

22 Q Referring to the contract and the acreage that you have
23 under the Pubco farm-out, you have a double number of
24 locations available to you on 80 acre spacing -- or to
25 your investors, than you would have on 160 acre spacing?

1 A I haven't counted them up, but it seems logical to say
2 that.

3 MR. SPERLING: I think that's all I have.

4 MR. UTZ: Any other questions?

5 (No response.)

6 MR. UTZ: If not, the witness may be excused.

7 (Witness excused.)

8 MR. UTZ: Does that complete your case?

9 MR. HINKLE: That concludes our case.

10 MR. UTZ: Any statements?

11 MR. BUELL: On behalf of H. L. Brown, Jr., we would
12 like to support the Harding Application and oppose the Pubco
13 Application.

14 On the 80 acre spacing, we feel it would be prudent
15 to require drilling either in the SE/4 Quarter or the NE/4
16 Quarter of any section.

17 MR. UTZ: The northeast?

18 MR. BUELL: The NE and the SW, I'm sorry.

19 MR. UTZ: Anything further?

20 MR. SPERLING: I would like to say just briefly,
21 Mr. Examiner, that we feel that the data which is based on
22 reliable information and not on speculative data which was
23 presented concerning the reservoir, certainly supports the
24 Application of Pubco for 160 acre spacing.

25 While it is true that there are only two wells

1 presently drilled and completed in the pool, the information
2 which is available at this time from the standpoint of
3 reservoir information is much more abundant than in any other
4 two well fields I have ever seen before. I think this
5 information shows conclusively that it would be economically
6 prudent to develop this field on 160 acre spacing.

7 MR. HINKLE: The well was deepened on information
8 given to Harding by Pubco which showed on its face that this
9 was possibly a very limited area. It has been brought out
10 here in testimony, that drilling in the Strawn area in the
11 vicinity of the northeast and east areas have been very
12 erratic and it is clear that this is a stratographic formation
13 or pool and that you can have a dry hole right next to a
14 producer.

15 I think that in summing up all the evidence together
16 that has been introduced by both sides, would indicate that
17 it is a limited reservoir and I think that Roy Williamson's
18 testimony shows very definitely that he wouldn't even advise
19 an operator to drill another well if the pressure continues
20 to drop. I don't think the Commission can assume here that
21 the reservoir has sufficient development to justify 160 acre
22 spacing, at this time.

23 So I believe the thing to do at this time would be
24 for the Commission to adopt temporary 80 acre spacing rules on
25 the basis of one year and to take a look and see what develops

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because it has been indicated that there are going to be several other wells drilled in the meantime.

MR. SPERLING: The obvious answer to that is, you can't undrill wells that are already drilled.

MR. UTZ: Any other statements?

(No response.)

MR. UTZ: If not, the case will be taken under advisement.

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