BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
and
RAILROAD COMMISSION OF
TEXAS
* *
February 26, 1954
Mabry Hall
Santa Fe, New Mexico

TRANSCRIPT OF PROCEEDINGS

CASE NO. 672

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

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OIL CONSERVATION COMMISSION
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PUBLIC NOTICE IS HEREBY given that a joint meeting of the New Mexico Oil Conservation Commission and the Railroad Commission of Texas will be held at 9:00 a.m. on February 26, 1954, at Mabry Hall, State Capitol, Santa Fe, New Mexico, for the purpose of considering proration methods, maximum efficient rate of production, and special pool rules for oil and gas pools embracing lands within the states of Texas and New Mexico; namely, the Bronco-Siluro-Devonian Poll in Lea County, New Mexico (the Texas portion of which lies in Yoakum County and is termed the Bronco Pool).) Case 672

BEFORE: Honorable Edwin L. Mechem, Governor,
Honorable E. S. "Johnny" Walker, Land Commissioner
Honorable R. R. Spurrier, Secretary to the Commission
Honorable Ernest Thompson, Texas Railroad Commission

R E G I S T E R

H. L. McCracken	Texas Railroad Commission, Austin Texas
Alden S. Donnelly	Honolulu Oil Corporation, Midland, Texas
George R. Hoy	Honolulu Oil Corporation, Midland Texas
R. S. Christie	Amerada, Tulsa, Oklahoma
Carl Barnhart	Amerada, Tulsa, Oklahoma
John A. Woodward	Amerada, Tulsa, Oklahoma
A. L. Porter	Oil Conservation Commission, Hobbs, N. M.
L. A. Hanson	Oil Conservation Commission, Artesia, N.M.

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MR. SPURRIER: The meeting will come to order please. As you all know, this is a joint hearing of the New Mexico Oil Conservation Commission and the Texas Railroad Commission to determine proper spacing and other related matters in the Bronco Pool which is a

pool common to Texas and New Mexico. For the remainder of the hearing, we will ask Mr. Ernest Thompson to conduct.

MR. THOMPSON: It is always a great pleasure for us, Governor Mechem, to come over here and meet with you and your colleagues on the Oil Conservation Commission of New Mexico.

The Texas Railroad Commission desires to work with you as a sister state in the conservation to the end, we hope, that identical rules and regulations on all phases of conservation work might be adopted by each state. To that end, we are glad to come here, Governor and gentlemen of the Commission, and sit with you in Santa Fe.

It is always a delight to come to Santa Fe anyway and just be with you all in the hope that your wishes may first be expressed so that we may later have a hearing in Texas at an early date with the view of adopting, as I said before, idential rules and regulations.

Case No. 672, notice issued by the State of New Mexico Oil Conservation Commission, State of New Mexico to all persons having any right, title, interest or claim in the following case, and notice to the public. Public notice is hereby given that a joint meeting of the New Mexico Oil Conservation Commission and the Railroad Commission of Texas will be held at 9:00 a.m. on February 26, 1954, at Mabry Hall, State Capitol, Santa Fe, New Mexico, for the purpose of considering proration methods, maximum efficient rate of production, and specail pool rules for oil and gas pools embracing lands within the states of Texas and New Mexico; namely, the Bronco-Siluro-Devonian Pool in Lea County, New Mexico (the

Texas portion of which lies in Yoakum County and is termed the Bronco Pool.) Given under the seal of the Oil Conservation Commission at Santa Fe, New Mexico, this 11th day of February, 1954, State of New Mexico Oil Conservation Commission, R. R. Spurrier, Secretary.

Who is here who wishes to give us the benefit of your experience and testimony upon which we may consider the promulgation of proper rules and regulations covering the subject mentioned in this notice?

MR. WOODWARD: John Woodward representing Amerada Petroleum Corporation, applicant in Case 672.

MR. THOMPSON: You are going to testify, Mr. Woodward?

MR. WOODWARD: No, sir. Mr. Christie and Mr. Barnhart are applicant's witnesses.

MR. THOMPSON: Any other witnesses? You may proceed with your presentation.

MR. WOODWARD: These are copies, if the Commission please, of the exhibits that Amerada will introduce.

MR. THOMPSON: You may proceed, Mr. Woodward.

MR. WOODWARD: Applicant asks that Mr. Christie and Mr. Barnhart be sworn.

(Witnesses sworn.)

MR. THOMPSON: Proceed, Mr. Woodward.

MR. WOODWARD: Applicant's first witness will be Mr. Barnhart.

C A R L B A R N H A R T

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. WOODWARD:

Q Mr. Barnhart, will you state your name, please?

A Carl Barnhart.

Q Where do you live, Mr. Barnhart?

A Tulsa, Oklahoma.

Q By whom are you employed and in what capacity?

A The Amerada Petroleum Corporation, senior geologist in charge of the Permian Basin.

Q Are you familiar with the Bronco Field in Lea County, New Mexico and Yoakum County, Texas?

A I am.

Q Have you previously testified before this Commission in your capacity as an expert witness as a petroleum geologist?

A I have.

MR. WOODWARD: Are Mr. Barnhart's qualifications acceptable?

MR. THOMPSON: Anyone contest the qualifications? If so, we will have him delineate his experience and education. If not, we will say he is eminently qualified. He is well known to the presiding officer. Any one wish to have him delineate his distinguished experience and education? If not, the qualifications will be accepted.

Q Have studies of the electric logs, cores and samplings in the Bronco Field been conducted under your supervision or direction and are you familiar with the results of those studies?

A Yes.

Q Mr. Barnhart, I hand you what has been marked as Exhibit A, will you tell what it is please?

A This is a structure map of the Bronco Field contoured on

top of the Siluro-Devonian.

MR. THOMPSON: That is the same map on the board behind you there?

A The same map that is displayed on the board.

MR. THOMPSON: Thank you.

A Using a contour interval of one hundred feet and, I might call attention to one thing on this map and that is, the hatchet area as shown simply delineates an operating unit. It is not to be confused with any of the geological information.

Q That delineates the operating unit of which Amerada is the operator?

A Yes.

Q What is the depth range of the producing formations in this field?

A From 11,380 to 11,920 with the present information.

Q Would you describe the geologic characteristics of this formation?

A The Siluro-Devonian in this field is a dolomite with vugular, primarily vugular and fractured porosity, minor amounts of intergranular porosity.

Q Mr. Barnhart, what type of geologic structure is indicated by Exhibit A?

A This is anticlinal fold.

Q Do you know of any structure irregularity in this anticlinal fold which would tend to obstruct movements of fluid through the formation?

A Based on the present information, I do not know of such

obstruction.

Q Does the area contoured on Exhibit A represent one continuous common source of supply contoured on Exhibit A?

A Yes.

MR. WOODWARD: Applicant has no further questions.

MR. THOMPSON: How many wells have been drilled in the area?

A A total of nine producing wells.

MR. THOMPSON: How many dry holes, if any?

A In the Siluro-Devonian, there have been three dry holes.

MR. THOMPSON: Twelve wells.

A Twelve wells.

MR. THOMPSON: Is the drilling of twelve wells, nine producers and three dry holes, great enough upon which you as an expert could advise the regulatory commissions as to the proper rules and regulations?

A I believe that we have now sufficient information to set up rules and regulations.

MR. THOMPSON: You think with twelve wells you have adequate information to guide you?

A I believe so.

MR. THOMPSON: In asking us to prescribe rules and regulations?

A Yes.

MR. THOMPSON: Any questions of any member of our group? Any of the engineers of the Texas or New Mexico Commission?

CROSS EXAMINATION

By MR. MACEY:

Q In your Number One Ward, Mr. Barnhart located on the Mexico side of the field, you refer to thefirst and second Devonian, would you explain that?

A There is an indication of a native fluid duplication of the Devonian on top of the Devonian. The map is contoured on the lower point as shown. That is a slight indication of some fault in that one well. However, it has not been found or evidence of it has not been found in any other well drilled to date in the field.

MR. MACEY: That is all I have.

MR. THOMPSON: Any further questions of this witness?

MR. GRAHAM: With reference to the State Line, Mr. Barnhart, how many wells on the Texas side and how many on the New Mexico side?

A I will double check myself but there are four in Texas and five in New Mexico.

MR. THOMPSON: May we share the honors on the dry holes the same way?

A Unfortunately or fortunately, whichever side we are on, we have one dry hole in Texas and two in New Mexico.

MR. THOMPSON: That makes the record complete. Any other questions of this witness? Thank you very much.

(Witness excused.)

R. S. C H R I S T I E

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. WOODWARD:

Q Will you state your name, please?

A R. S. Christie.

Q Where do you live, Mr. Christie?

A Tulsa, Oklahoma.

Q By whom are you employed and in what capacity?

A Amerada Petroleum Corporation, engineer.

Q Mr. Christie, are you familiar with the Bronco Field in Lea County, New Mexico and Yoakum County, Texas?

A Yes, sir.

Q Have you previously testified before this Commission in your capacity as an expert witness or as a petroleum engineer?

A Yes, sir, I have.

MR. WOODWARD: Are Mr. Christie's qualifications acceptable?

MR. THOMPSON: Anyone wish to have him delineate his experience and education? If not, we assume his distinguished qualifications are accepted by every one. Go ahead.

Q You have before you Mr. Christie Exhibits Marked B through H. I will ask you to tell what the Exhibits are and in doing so explain the purpose and the reason for this application.

A The reason for the application, of course, is to propose a set of field rules to operate this field under and to determine the MER and also establish an allowable for the pool.

MR. THOMPSON: And for the orderly development of the field?

A Yes, sir, that is correct.

MR. THOMPSON: Go ahead.

A The Bronco Siluro-Devonian Pool as has been stated in the notice is located in Lea County, New Mexico and Yoakum County, Texas. Based upon the present stage of development, it appears that the productive area will be equally divided between the two states. The discovery well, Weems No. 1 was completed on November 5, 1952. At thepresent time there are nine completed wells and two drilling. Exhibit A has already been presented and described by Mr. Barnhart. Exhibit B is a copy of the proposed field rules. It will be noted we are not proposing a special spacing rule, preferring to operate under the state-wide rules of the separate states. The statewide rule for New Mexico is 330660' and for Texas 330-933' which provides sufficient flexibility for further development in the Devonian as well as the shallower pays.

We believe that we can operate and drill the remaining wells under the state-wide spacing rules without any difficulty. It appears that most of the wells will be located in the center of 40's or 66-1320's but the particular statewide rules provide for closer spacing if it is necessary, around the edge particularly.

MR. THOMPSON: Could you tell us roughly the cost of these wells in round figures about?

A The cost of this well -- the costliest well was the Schenck Number 1 located in New Mexico. It cost $341,000.00, however that well was taken from the granite and was plugged back. The Ward Number 1 well which was probably a representative well cost $225,000.00, so that in my opinion the average cost of future wells unless some trouble is encountered would be approximately $225,000.00.

MR. THOMPSON: Thank you.

A Briefly without reading the rules. Rule 1 is the casing program which provides for three strings of pipe set and cemented in such a manner as to adequately protect all fresh water, salt and potash formations, and other probable oil and gas producing formations. Will it be necessary to read the entire rule?

MR. THOMPSON: Let's have comment on that rule from anyone who wishes to comment?

MR. McCRACKEN: How many feet of surface casing?

A Approximately 300 feet.

MR. THOMPSON: A is your casing program?

A Exhibit B shows the field rules and Rule 1 is the casing program, yes, sir.

MR. DONNELLY: Alden S. Donnelly, Honolulu Oil Corporation. I have a question on that. I note in part C of your proposed Rule 1 you have provided for a full length string of oil string to be run. I would like to suggest that the operator at his option be permitted to run a liner rather than a full length oil string of casing. The top of the liner to extend at least 200' into the next larger string of casing and to be cemented to it or attached to it with an accepted liner hanger and liner seal or the two strings of casing shall be cemented together. Would there be any objection to that, Mr. Christie?

A As an alternate procedure, we wouldn't have any objection.

MR. THOMPSON: Then the rule with your consent as offered could add what has just been suggested as an alternative?

A Yes, sir.

MR. THOMPSON: without objections on your part?

A We have no objections.

MR. THOMPSON: Anyone here see the objection to the suggested alternative? Please give the reason why you suggest the alternative.

MR. DONNELLY: The intermediate string of casing in this well will be approximately 4600 feet long. During the War in many of the deep fields in West Texas or the past Korean War, we have set a number of liners to save steel. In this case it would save approximately 4500' of oil string. The one requirement is that the two strings of casing be tacked together where there is no possibility of a leak.

MR. THOMPSON: Has it been found equally satisfactory?

MR. DONNELLY: It has been and we believe on down the line with the larger pipe at the surface, it may be possible to develop dually completed pumping wells if we have nine and if eight were to work instead of seven inch.

MR. THOMPSON: Anyone have any objection to the later suggestive, the alternative suggestion that has been accepted by the witness? We found it to be good practice and very acceptable in our State. No. objection? We will consider then that you will offer this amendment so that it can be written into the rules?

MR. DONNELLY: I will.

MR. THOMPSON: Offer it to both Commissions and mark it supplement to Rule C, No. 1.

A Rule 2 provides for the size, and to a limited degree, the shape of the proration unit, including also the tolerance feature.

That simply provides for 40-acre proration unit with a 2100' diagonal and the 20-acre tolerance for the 40-acre unit.

MR. THOMPSON: For the convenience in allocating proration allowables?

A Yes, sir.

MR. THOMPSON: Any objection to the Rule 2 as explained? Proceed.

A Rule 3 provides for the allocation of production based on 100% acreage.

MR. THOMPSON: Any comment from anyone on Rule 3, 100% acreage?

A I might say here that in New Mexico all production is based on 100% acreage and, of course, we have many fields in Texas that have 100% acreage and would seem to present less difficulty to have that type of formula.

MR. THOMPSON: Is the producing pay about uniform in thickness?

A Not in thickness but in quality it is.

MR. THOMPSON: So, it would average out all right on 100% acreage?

A Yes, I think it would.

MR. THOMPSON: Sometimes, we have a fellow with a thin section very happy to get 100% acreage. A fellow with a thick section not so happy over it.

A Well, nature provides for that generally. If they have a thin section, they get an early allowable, but they get wiped out of the picture a lot quicker. It evens up pretty well.

MR. THOMPSON: I am bringing up a point for the record.

Sometimes the cold reading of a record doesn't cover the full spirit of the hearing. These questions and answers do. Any question from anyone on the Rule 3, 100% acreage? Proceed.

A Rule 4 provides for a limiting gas-oil ratio of 2000 cubic feet of gas per barrel of oil produced. That is more or less a standard rule in both states where there are no special rules.

MR. THOMPSON: Any objection to 2000 to one gas-oil ratio going into the rules for this field? I hear none. Anything else?

A The rules here proposed are few but we believe they are adequate for proper and efficient operation and are inclusive enough to prevent waste and protect correlative rights. That is all the testimony I have.

MR. THOMPSON: Did you work with others in the preparation of these proposed and suggested rules?

A A copy of the proposed rules were sent to all known operators in the field.

MR. THOMPSON: Did you get any response from any of them?

A We got a response from the Texas Company which I will read into the record if you wish.

MR. THOMPSON: Please do.

A This is addressed to the Oil Conservation Commission, New Mexico. "Gentlemen: This is to advise that the Texas Company is in favor of proposed rules for the Bronco Siluro-Devonian field in Lea County, New Mexico and Yoakum County, Texas as submitted to the Texas Company by Amerada Petroleum Corporation with Mr. R. S. Christie's letter of February 11, 1954. The Texas Company also has no objection to adoption of the proposed 240 barrel per calendar day allowable without shut-down days in both states".

MR. THOMPSON: That has not been mentioned.

A No, we haven't gotten to it yet. The magnolia advised me over the telephone that they were in favor of these rules with the exception of the 40-acre unit and they preferred an 80-acre unit. But as far as the other three rules, they concur.

MR. THOMPSON: Does that include all of the operators?

MR. DONNELLY: Mr. Commissioner?

MR. THOMPSON: Yes.

MR. DONNELLY: On the part of Honolulu Oil Corporation, we have seen these proposed field rules and recommend their adoption with the modification we suggested earlier in the hearing.

MR. THOMPSON: The witness has accepted your modification so then you could say, as now offered to this Commission?

MR. DONNELLY: I wish to amend my statement that way.

MR. THOMPSON: Proceed.

A I might say that the other operators in this operating unit are Magnolia, Warren, Sinclair and Coates and each of these company's have been advised of the proposed rules and has appointed Magnolia and Honolulu and Texas Company - -

MR. THOMPSON: You did send copies to each and every operator you knew in the field?

A I did.

MR. THOMPSON: Did Mr. Livermore get a notice?

A He did not, yet. He is not within the confines of this pool.

MR. THOMPSON: He drilled a dry hole out there.

A It is quite aways off, I believe.

MR. THOMPSON: Here is a telegram, will you read it into the

record.

MR. SPURRIER: Yes. "Please be advised that Warren Petroleum Corporation supports the position of Amerada Petroleum Corporation with regard to the adoption of proposed field rules for the Bronco Siluro-Devonian Field of Lea County, New Mexico and Yoakum County, Texas, namely that the proposed field rules should be adopted. Signed E. S. Valkert, Warren Petroleum Corporation".

MR. THOMPSON: It is admitted into the record. You have further testimony.

A Next, I would like to take up the question of the MER. The Devonian formation is a vugular, fractured, intergranular dolomite source bed which from all indications appears to have good communication throughout the reservoir. To substantiate this conclusion the following Exhibits are submitted. Exhibit C is a tabulation of pertinent well information on wells completed prior to February 1. That includes all wells except the Texas Company well.

MR. THOMPSON: You offer these Exhibits for the record?

A I do.

MR. THOMPSON: They will be received.

A Reference is made particularly to the potential tests, bottom hole pressures and thickness of the producing section. You will note that the potentials vary from 560 barrels in 24 hours, correction 413 barrels to as high as 2364 barrels in 24 hours on choke. The bottom hole pressures have declined very little and are very uniform. The P. I. tests also reflect the producing characteristics more particularly the permeability of the formations, and the P. I. vary on the four tests that we have taken from

1.94 to 42,37. Exhibit E is a graphical interpretation of the oil and water production, average bottom hole pressure and the number of wells.

MR. THOMPSON: Any question occur to anyone at any point, please feel free to ask them. You may proceed.

A Exhibit F is productivity index reports on four wells that I mentioned previously. These tests indicate the wells are capable of producing at relatively high sustained rates. As Exhibit F we have included a copy of all those four tests.

MR. THOMPSON: They are self-explanatory?

A Yes, sir.

MR. THOMPSON: Proceed.

A Exhibit G is a report of the only core analysis taken in the field that we are familiar with as far as the operations of Amerada is concerned.

Of the 113' cored and analyzed, 92' or 81.4% is considered productive, that is had a permeability of greater than one milidarcy. Based on this analysis and the interpretation of electric logs on all wells, it is estimated the average net effective pay is approximately 70%. Later, I will give that exact figure.

Exhibit H is an electric log of the Ward No. 2 well which is presented primarily as a representative log. All these logs in such deep wells build up in files and one is representative of all logs, although there is some difference in all of them.

A Study of these Exhibits, E through H, indicates a reservoir having a water drive, high productive capacity and therefore capable of high sustained rates of flow. While it may be somewhat premature to determine the MER based on the performance of the

reservoir to date and from the various tests that have been conducted, it is my opinion the reservoir with a sufficient number of wells, is capable of producing without waste nine to ten thousand barrels daily.

Assuming the ultimate number of wells will be approximately 15, the per well MER would be 600 barrels daily. However, we would prefer to keep the MER on a reservoir basis for it is unlikely all wells will be capable of producing 600 barrels daily. Notwithstanding this opinion, we are not recommending, of course, an allowable of 600 barrels daily.

MR. THOMPSON: Will you explain why not?

A 600 barrels a day would be, in my opinion, unfair from an equity standpoint of allowables as between fields and we would prefer to keep the allowable down within the normal allowable of fields of that depth.

MR. THOMPSON: What would be your recommendation?

A I will give that now.

MR. THOMPSON: Go ahead.

A Do you have a question, Mr. Spurrier?

MR. SPURRIER: Yes, sir, I do. Did I understand you to recommend 240 barrels?

A Yes.

MR. SPURRIER: Per well per day?

A That will be my recommendation.

MR. SPURRIER: What is the allowable in Texas now, per well?

A I will read this next paragraph and I think that will answer all your questions.

MR. SPURRIER: All right.

A The present allowable for wells in the Bronco Siluro-Devonian is 227 barrels per well in New Mexico and 290 barrels per well in Texas, which is the discovery allowable. This field as far as Texas is concerned is still operating under the discovery allowable.

MR. THOMPSON: That is granted until six wells are completed or the field is eighteen months old, whichever is sooner.

A Based on the so-called 1947 yardstick, for Texas, the allowable in Texas, on a 40-acre unit, at a depth between 11,500' and 12,000' is 310 barrels. This allowable would normally go into effect when the discovery allowable is terminated. The two states have different methods of adjusting the monthly allowables to conform to the market demand. For the month of March, New Mexico will maintain its February rate and Texas will be producing on an 18 day schedule.

Disregarding the discovery allowable, the allowables then would be 227 barrels in New Mexico and 180 barrels in Texas on a calendar day basis. We apparently are going into a period of greater demand, therefore, to take care of such a contingency and to simplify the mechanics of establishing allowables for this two state pool, we recommend an allowable of 240 barrels per calendar day without shut down days.

MR. THOMPSON: Without shut down wells on either side of the State line would be producing the same rate?

A Yes.

MR. THOMPSON: That has been our custom to give the same state allowable.

A I understand it is.

MR. THOMPSON: You made reference to the increase in the allowable. May I state for the record, prior to the increase, the State Railroad Commission had cut the allowable 410,000 barrels, so all we did was just work off stocks and restore, well, 159,000 to be exact, of the 410, the increase was 159,000 barrels per day but there were approximately 200,000 at the end of March on account of new wells. So, your figure of 200,000 would be correct about March 31.

A Based on various estimates of economies and so forth, it appears that the demand might increase some this next year as it has in the past.

MR. THOMPSON: About four or five percent.

A Therefore, we will anticipate that this 240 barrels we think might average out over a year's time as the average allowable for these wells.

MR. THOMPSON: Most economists say it increased in consumption for 1954 over 1953 would be four or five, or maybe five and a half percent. I noticed yesterday the latest statement was four percent increase over 1953 which would be good, of course, because 1953 was the banner year of the industry.

A Actually in New Mexico, it would only have to increase there about two barrels per well to bring that up to the 240, I believe would be 256, if I remember correctly, and Texas would have to have about 22 days to bring it up to 240, somewhere in that neighborhood.

MR. THOMPSON: Whatever would be equal so they would have the same withdrawals on each side of the line?

A Yes, but it would be impossible to apply the different state formulas and have it even.

MR. THOMPSON: We understand that. That is the reason for the joint hearing so as to listen to you on this.

A Finally, then such an allowable would be fair and equitable, in my opinion, and would prevent waste and protect correlative rights.

MR. THOMPSON: And would not inordinately draw down pressures or tend to increase gas-oil ratios?

A In my opinion, it would not.

MR. THOMPSON: Based upon the studies you have given us here?

A That is correct.

MR. THOMPSON: Any questions on this point by anyone?

MR. MACEY: Mr. Christie, I think you are familiar with our present case here in New Mexico, Case 608, pertaining to the adjustment of the deep well factors where we sent out and obtained a large amount of statistical information on well costs. In connection with that, the Commission's staff is going to recommend a reduction in some of the factors which we give to the deep wells at the present time.

We made a rather hasty check a few moments ago, about what the allowable approximately would be if the Commission adopted the new system and that pool which is now getting 227 barrels per day, that is on an every day basis, would end up -- and this is an approximation -- with approximately 204 barrels per day. I noticed that you mentioned the inequities between pools as far as allowables are concerned. Don't you think that possibly if you gave the Bronco

240 and gave other pools in the same depth range, the approximately 202 or 204 barrels a day, don't you think that would be an inequity between pools there?

A I think it would if you actually change the depth factors, why, it would.

MR. MACEY: I am looking down the road. If we went along on a 240, then two months from now, we cut what it is presently 227 to 203, we might, put it bluntly, we might get a little static.

A Actually, this is a rather small pool. If you want to make a comparison, we will go back over in Texas and assume they have a 31 producing schedule with 310 barrels per day. It is hard to arrive at an even figure and have everything in balance.

MR. THOMPSON: Couldn't we not resolve that question by having me say that the Texas Commission will follow the New Mexico Commission on allowable. Would that resolve it?

MR. SPURRIER: It would.

MR. THOMPSON: I make that statement. If you see fit to take those factors into consideration in your state and make it 202, even though 240 has been recommended and it came about that your policy would bring it to 202, and then a copy of that order were sent to us, it would be of sufficient force to us to make ours identical, if the Commission should adopt it, if, as and when. Is that all right?

MR. SPURRIER: Yes, sir.

MR. THOMPSON: Governor?

GOVERNOR MECHEM: Yes, sir.

MR. THOMPSON: Walker?

MR. WALKER: Yes, sir.

MR. THOMPSON: You would see no objection to that?

A No, we are giving the facts and rely on the wisdom of the Commission to set the allowable.

MR. SPURRIER: 310 barrels a day for 18 days would be 5580 barrels for the month, that is in Texas, while 204 barrels per day for our average 30-day month would be 6120 barrels, so the allowable as proposed by Mr. Macey would still be higher than an ordinary Texas allowable for that pool. Am I correct?

A Well, if your figures are correct, your opinion is correct.

MR. WOODWARD: Your statement and recommendation dealt with one set allowable for wells in both states for an entire year period in which demand might fluctuate and which shut down days may fluctuate and in the interest of simplicity, I believe you stated in your statement you were suggesting one figure for the entire year to take care of these fluctuations in demand and increases and decreases in the allowable as to other fields in both states, is that correct?

A Yes, that is correct.

MR. THOMPSON: What we would do, Gentlemen, from Texas, in view of the fact that New Mexico would operate each day, we would do the same, so you would have the same daily withdrawal and not have a shut in period and adopt the same allowable. So, you would have the field operating as one unit just like it was in New Mexico. You see no objection to that from an operating standpoint?

A No.

MR. THOMPSON: Either from the reservoir engineering standpoint?

A No, sir.

MR. THOMPSON: Do you have anything further?

A I have some additional information that might aid in determining the MER which is a tabulation that the Railroad Commission sends out for all MER hearings. The average porosity 5.8 percent. Average permeability, this is taken on that one core that I mentioned, 148 milidarcies. The water-oil contact, minus 8105. We have no gas cap, therefore, no gas-oil contact. The average net effective oil pay thickness, 186', which is based on the seventy percent that I mentioned, seventy percent of the gross which I mentioned earlier. The average gravity oil is 44 degrees API. We have no gravity on the gas. The solidity of the water, 54,000 parts per million chloride. We have run no bottom hole sample analysis, therefore, we don't know what the saturation pressure is or the formation volume factor is. However, we are sure that there is less than 800 pounds. Original reservoir pressure, 4709 pounds, that is minus 8,000', at a temperature of minus 172 degrees.

We have taken two periodic surveys, one on 10/1/53. The average pressure was 4769 pounds and have present pressure on February 15, 4775 pounds. I might point out that is an increase over the last pressure; the reason for that is the allowables in the State of New Mexico have been decreased and therefore the pressures are coming back up, which reflects a very active water drive. The reason that they are less in Texas and higher in New Mexico is that we couldn't shut them all in at the same time and we had some of them producing so that the reservoir couldn't equalize.

MR. THOMPSON: Would you suggest a shut in period for equilization to get more accurate figure?

A Ordinarily we do, but in this particular case, we are using the gas for drilling purposes, we couldn't shut them in all at the same time.

MR. THOMPSON: You don't think it desirable?

A Not in this particular instance. What we want to do is try to get an average pressure as recent as we could for this hearing. I mentioned before the productivity index varied from 1.55 to 42.37. There is only one well in the field making water which results in less than two percent of the fluids in the field being water.

Average GOR is 3700 cubic feet per barrel. Our usual practice in setting pipes is to set on top, or through, and perforate and acidize with just enough acid to moisten mud for the formation. The average well density is one well to 40, or slightly in excess of what, due to some larger units in New Mexico. The volume of flare gas is 245 MCF, except when we are drilling and we have no flare gas at the present time. It is all used for drilling purposes. Of course, being a new reservoir and water drive, there is no pressure maintenance being carried out at this time.

MR. THOMPSON: Isn't that very low gas-oil ratio?

A It is very low, but that is characteristically deep up in the permian basin, we have some as lowas 20 to 30.

MR. THOMPSON: Do you have anything further to add?

A I believe that is all.

MR. THOMPSON: Any questions of this witness by anyone?

MR. MACEY: Mr. Christie, do you have any dates to recommend as far as poolwide, or bottom hole pressure surveys might be conducted?

A Nothing specific. I certainly think one a year would be ample because we don't expect them to increase under a water drive system. We will take, I am reasonably sure, take two pressure surveys a year anyway, and at the present time we are taking them in, well, it will be October, and somewhere around March, if that is satisfactory.

MR. THOMPSON: If we require one to be taken not later than November 1st, something like that, that would fit your schedule?

A Well, the last one in order to fit our schedule, the last survey we took last year was in October and we ran this one up a little bit on account of the hearing.

MR. THOMPSON: If we should prescribe one survey to be submitted to the Regulatory Commissions of the State, not later than November 1st --

A For GOR?

MR. THOMPSON: Yes.

A Yes, that would be all right.

MR. THOMPSON: It would not inconvenience you in your orderly work.

A It would be all right, if it would fit into the schedule.

MR. MACEY: Yes.

MR. THOMPSON: Do you have some other date in mind?

MR. MACEY: No, once a year by November 1st. That would be very satisfactory.

MR. THOMPSON: It would suit us all right, now, Mr. McCracken?

MR. McCRACKEN: Yes.

A I am not sure whether it is now set up or not. It it is

I think that would be all right, whatever time it is.

MR. THOMPSON: Just so we can have something in the order.

A I would like also to suggest that this field be called Bronco Siluro-Devonian Field. I think it is actually called the Bronco Pool in Texas and Siluro-Devonian in New Mexico.

MR. THOMPSON: One name should be given on both sides. Tell us why you wish the long descriptive name?

A I will let Mr. Barnhart answer that.

MR. THOMPSON: For the record.

MR. BARNHART: It is very difficult, particularly on the north platform to differentiate between the Devonian and the Siluro so it is common practice to define the two formations and use a joint name of Siluro-Devonian. Our suggestion is that the term Siluro-Devonian be used.

MR. THOMPSON: Bronco --

A With the field, Bronco, yes.

MR. THOMPSON: Three? Bronco --

A Bronco-Siluro-Devonian.

MR. THOMPSON: Which do you want first?

A The field name Bronco Siluro-Devonian, designating the reservoir.

MR. THOMPSON: Is that agreeable with you gentlemen? We have taken up that solid matter and it is agreed; it is so named.

MR. McCRACKEN: I believe the field is Bronco-Devonian, in Texas.

MR. THOMPSON: He wants to add the word, Siluro.

A I all probability, we will have several other reservoirs in this

field. There will be a Bronco Pennsylvania and Bronco Mississipian.

MR. THOMPSON: So, you will be able to distinguish.

Any questions of the witness before he is excused?

(Witness excused.)

MR. THOMPSON: Do you have another witness?

MR. WOODWARD: I would like to call Mr. Barnhart.

MR. THOMPSON: Do that.

C A R L B A R N H A R T,

recalled as a witness, being first duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. WOODWARD:

Q Mr. Barnhart, are you familiar with the location of Mr. Livermore's dry hole previously referred to?

A Approximately a mile or mile and a half north of the northeasternmost producing well of the field. In my opinion, it is separated from the structure of the Bronco Field and was not included.

MR. THOMPSON: I see. You understand I heard there was a dry hole, I wanted to have the record covered.

A In this study, it is not included.

MR. THOMPSON: In your opinion, it is separate from this producing --

A (Interrupting) From this structure, yes.

MR. THOMPSON: Any further questions on that?

MR. WOODWARD: Not on that point.

MR. THOMPSON: Do the electric logs in your opinion accurately reflect the true porosity of the Devonian in this field?

A The micro log in this field, in my opinion, is not a true

reflection of the porosity. That is based on sample studies and studies of the cores, drillstem tests and production tests. My explanation of that being the nature of the reservoir itself. It is primarily a vugular and fractured porosity and in that type formation, why, micro log will not give a true reading. As a result there will be some discrepancy between the micro logs and the average porosity figure as given by Mr. Christie.

MR. WOODWARD: That is all.

MR. THOMPSON: Any questions of Mr. Barnhart?

(Witness excused.)

MR. THOMPSON: Anything else to bring before the two Commissions?

MR. WOODWARD: No, sir, that concludes our presentation.

MR. THOMPSON: Anyone have anything to say for this record before it is closed? Anyone? (No response.) The record is closed, the hearing is adjourned. We thank you very much for your attention and for this information.

(Whereupon, the hearing was adjourned.)

C E R T I F I C A T E

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the Oil Conservation Commission of the State of New Mexico and the Railroad Commission Of Texas, held in Mabry Hall on February 26, 1954, Santa Fe, New Mexico, constitutes a true and correct record of said proceedings to the best of my knowledge, skill and ability.

DATED at Albuquerque, New Mexico, this 2nd day of March, 1954.

Ada Dearnley

REPORTER