BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

TRANSCRIPT OF PROCEEDINGS

CASE NO. 407

September 16, 1952
Regular Hearing

ADA DEARNLEY & ASSOCIATES
COURT REPORTERS
ROOM 12, CROMWELL BLDG.
PHONES 7-9645 AND 5-9546
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

SEPTEMBER 16, 1952

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In the Matter of:

The application of the Commission, upon its own motion, for an order extending Section "G", Oil Proration and Allocation, to provide for the addition of Rule 508, Establishment of Temporary 80-Acre Proration Units. In principle, this suggests the establishment of 80-acre proration units for wildcat wells completed as oil wells with a pool depth range of 10,000 feet or more, and includes further stipulations (as legally advertised in all oil-producing counties of New Mexico).

Case No. 407

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(Notice of Publication read by Mr. Graham.)

MR. MACEY: I don't think there is any necessity of reading in proposed rules. As far as advertisement, am I right to assume the case is continued?

MR. SPURRIER: Has someone made application for this case to be continued? Is there objection to continuing the case?

MR. HOLLOWAY: In event this is continued, as I am presuming it will be, may the record show that Tide Water recommends the adoption of this rule. We may not have a representative at the next hearing.

MR. C. R. BICKEL: Mr. C. R. Bickel, representing Shell. I would like to make a statement in this connection. Shell Company favors the adoption of the rule. It is our view that the proposed rule would encourage the development of deeper fields and take care of controversial space problems that come before this Commission. Many of the controversies have been more over how to protect the equities of the dry wells drilled on 40 acre spacing and how to work out 80 acre units than over the desirablilty of 80 acre spacing. The proposed rule should reduce such controversy and it is our hope the Commission will see fit to adopt it.

MR. HOLLOWAY: Due to the fact that interested parties have not had opportunity to review the case I suggest the Commission detain the case to a later date.

MR. A. R. BALLOU: Ballou. Mr. Spurrier, when will this be continued to, the next regular meeting?

MR. SPURRIER: Yes, October 15.

MR. BICKEL: Shell Oil Company would like to go on record at this hearing as favoring the adoption as we understand the rule to be written on the temporary basis and evidence to be presented after a sufficient number of wells have been drilled to determine the spacing pattern.

MR. SPURRIER: Anyone else?

MR. R. S. CHRISTIE: Christie, Amarada. We wish to urge the adoption of the rule as written and in the event we are not present at the meeting as continued we would concur in Mr. Holloway's

suggestion.

MR. M. I. TAYLOR: Taylor, representing Gulf. We would like to go on record as favoring the proposed rule.

MR. J. H. RICHTER: J. H. Richter, representing Atlantic. We approve of the recommended adoption of the proposed rule as it is. We feel it is a very definite step in the exploration, of encouraging the exploration of the deeper pays. There are several advantages we would like to list. It is pretty obvious wider spacing is necessary for quick definition of reservoirs. It would aid in faster development. Such things involved as risk in drilling these wells, precludes closer drilling until reservoirs are defined and the possibility of such wells not paying out. We feel exploration will be encouraged. You can always go to 40 acres from 80 acres but can not enact the reverse. It would also save casing, and other materials vitally needed would be saved for future exploration work and would help the national steel shortage.

That is all I have.

MR. SPURRIER: Anyone else?

MR. W. E. HUBBARD: I would like to go on record as favoring the rule for the reasons given here this morning.

MR. E. H. FOSTER: Mr. Foster, I'd like to go on record as being - - Phillip's Company - - as being in favor of the rule.

MR. SPURRIER: Anyone else, anyone opposed?

MR. CAMPBELL: Are we having the hearing now? I thought it was going to be continued.

MR. SPURRIER: We would like for the people here to be heard now that want to be heard. The Commission would like to know if there is an objection to setting a time limit not only on the number of wells but a time limit on whichever should come first, for example, 18 months.

MR. BALLOU: In that connection I would like to say that we have an expense with a well below 10,000 feet in southeastern New Mexico now, Sun Oil Company does. The time limit, you may not be able to get 5 or 6 wells drilled and you may not be able to accumulate any appreciable engineering data on which to write permanent rules. If you set too short a time limit this well that we are trying to make produce now - - I think the company has been fooling with it five or six months, and somebody else five or six months before we did.

MR. GRAHAM: You favor a reasonable time.

MR. BALLOU: I suppose 18 months may not be unreasonable. After a first well is drilled you can usually get the other well drilled a little faster. I would just like to point out some of

these deep wells require an awful lot of time and should be taken into consideration.

MR. McKELLAR: I didn't intend to make a statement at this time. I wanted to reserve my remarks to the final hearing. Since you are considering the time we strongly support in favor of this recommendation. On the time element, 18 months would be highly unreasonable in that it takes 6 months to drill and complete deep wells and then you have to go over your studies, your logs, geology and all those problems have to be considered and decided where you are going to drill your next location. Three or four months elapsed and another six months, and at the end of 18 months you probably won't have over 2 or 3 wells. Now if you are going to go about this with some system connected with it, which I was led to believe, you have to have pressure surveys and exhibits, the Commission has seen presented in these cases before them. I don't know what the position of Magnolia would be on the time limit, but I think it would be better to leave it open. The companies have to drill in order to maintain their leases and if they don't get 5 wells in it will be probable because they have drilled some unproductive wells and 2 years or so elapses. You can call a hearing and let the company show why they should be granted additional time. I would like to see it left open. You can tell when a company is not going about the job properly, but I would rather see it left open.

MR. SPURRIER: With no number of wells received.

MR. McKELLAR: Put your five wells on, or whatever you decide.

I think five would be sufficient to give you some indication of what you have. You can run your pressure surveys and get an idea of what the structure is and determine how you should proceed from then on. It may be in some cases you may want to do it in less than five.

MR. CAMPBELL: May I ask the Commission if it is the intention to grant to these first five wells an allowable based upon the present 80 acre formula. Is that the thought the Commission has in mind in connection with this proposal?

MR. SPURRIER: That is the thought I had in mind. Anyone else? If not the case will be continued to October 15, and we will circulate a revised rule. In fact, it will be a revision of this proposal you received this morning.

MR. FOSTER: You say you are going to circulate a revised rule. Do you have in mind what the revision will be?

MR. SPURRIER: The proposed rule I don't exactly.

MR. FOSTER: You have in mind what you are going to revise about it? Can you tell us now?

MR. SPURRIER: No, sir.

MR. FOSTER: How do you know you want to revise it?

MR. MACEY: It might be possible we would want to put in a jurisdiction clause.

MR. SPURRIER: We have taken testimony here not sworn but Mr. Campbell has his opinion and a few others. I don't feel that this proposal will necessarily stand. I am not saying it will be changed but I think it will.

MR. FOSTER: I am just asking to be informed in what way this proposal will be changed. I just want to know in what particulars you are going to change it, and what the jurisdiction question is that is involved.

MR. SPURRIER: My answer was I don't know.

MR. FOSTER: Has someone raised a jurisdiction question about this matter? I didn't hear any jurisdiction question raised about it. I just wanted to have something to be thinking about. If you are going to change the thing and know now you are going to change it, it just occurred to me you probably had something in mind you are going to change and if you have I want to hear about it.

MR. SPURRIER: The next case on the docket is Case No. 309.

STATE OF NEW MEXICO)
:
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of hearing in Case No. 407 before the Oil Conservation Commission, State of New Mexico, at Santa Fe, on September 16, 1952, is a true and correct record of the same ot the best of my knowledge, skill and ability.

DATED at Albuquerque, New Mexico, this 25th day of Sept., 1952.

Marianna Meier
REPORTER

BEFORE THE

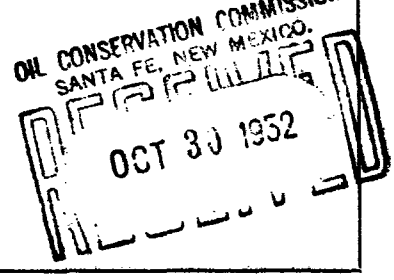
OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

TRANSCRIPT OF PROCEEDINGS

CASE NO. 407

Regular Hearing
October 15, 1952



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BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

Santa Fe, New Mexico

October 15, 1952

In the Matter of:

(Continued from September 16 hearing)
The Commission's motion for extension of Section 'G', Oil Proration and Allocation, to provide for the addition of Rule 508, Establishment of Temporary 80-Acre Proration Units.

Case: 407

TRANSCRIPT OF HEARING

(Notice of publication read by Mr. Graham.)

MR. SPURRIER: Anyone to be heard? Judge Foster.

MR. FOSTER: I don't know whetner everybody knows it or not, but there was a Committee appointed to study the proposal and make its recommendation at this meeting. I am not the chairman of that Committee, I am just one of the members, but I just want to say there has been no Committee Meeting and I assume that there probably will be, and there will be some sort of report available for action by the Commission at the next hearing. I don't know. You might advise everybody who is on that Committee.

MR. SPURRIER: I will be glad to. I have a letter here from the Chairman of the Committee, Harry Leonard, dated October 6th. Incidentally, the members of that Committee are Judge Foster, R. S. Christie, Ed McKellar, G. T. Hanners and Jack Danglade. Here is what Mr. Leonard says on October 6th:

(Letter read.)

MR. SPURRIER: Does anyone have a comment on this case, or is there any testimony to be introduced, at this time?

MR. McKELLAR: I don't have any testimony to be introduced, but I would like to request on behalf of Magnolia that the matter be continued until the next hearing, which would be the November 13th hearing.

MR. SPURRIER: November 20th.

MR. McKELLAR: We are very much desirous of finishing this matter up at the earliest possible date. I see, personally, no reason why it should be continued until sometime in the spring. I would like to have the matter continued to the next meeting and be prepared, at that time, to put on some testimony.

MR. SPURRIER: In view of the indefinitness of this letter, the Commission, on its own motion, yesterday moved to continue the case to the November 20th hearing, a definite date.

MR. FOSTER: Will it be considered at that time?

MR. SPURRIER: Yes, sir.

MR. FOSTER: Has the chairman been notified that it will be continued to November?

MR. SPURRIER: No, but he will be notified, so will all the members of the Committee. Obviously the Committee should meet before the next hearing. Is there any further comment?

MR. SPELLMAN: I wonder if I might read into the record a comment I have.

D. K. Spellman. The Ohio Oil Company urges the adoption of the rule proposed by the Oil Conservation Commission for the establishment of temporary 80-acre proration units applicable to new oil pools discovered at depths exceeding 10,000 feet. We believe also that the proposed rule should be so written that it establishes some uniform pattern for the development. That is, it should specify that wells should be drilled in alternate 40-acre locations to the discovery well. For example, assuming that the discovery well is drilled in the northwest quarter of a quarter section, then other wells must be drilled in either northwest quarters or southeast quarters of each quarter section for as long as the 80-acre proration units are maintained within the pool. We believe also that the proposed rule should specifically permit 80-acre units to be so assigned that they may be elongated in a north-south direction or an east-west direction, at the operators discretion.

MR. SPURRIER: Anyone else? If not, we will move on to Case 410.

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

I, ADA DEARNLEY, hereby certify that the above and foregoing transcript of proceedings in Case No. 407, taken before the Oil Conservation Commission on October 15, 1952, at Santa Fe, New Mexico, is a true and correct record.

Dated in Albuquerque, New Mexico, this 22nd day of October, 1952.

Ada Dearnley
Notary Public

My Commission Expires:
June 19, 1955.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

TRANSCRIPTION OF HEARING

CASE NO. 407

November 20, 1952

E. E. GREESON
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ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

NOVEMBER 20, 1952

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In the Matter of:

(Cont'd. from September and October hearings) The Commission's motion for extension of Section "G", Oil Proration and Allocation, to provide for the addition of Rule 508, Establishment of Temporary 80-Acre Proration Units.

Case No. 407

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(Notice of Publication read by Mr. Graham.)

MR. SPURRIER: The meeting will come to order, please. Before we take up the next case, which is 407, I would like to read an announcement which Judge Foster handed me. "A meeting of Texas oil operators will be held in Dallas, Texas, on Tuesday, November 25", that is next Tuesday, November 25, "at 10:00 o'clock a.m., in rooms 1509 and 1510 of the Magnolia Building, for the purpose of discussing the proposed changes of the Railroad Commission of Texas, of Statewide Rules 24 and 25, pertaining to the production proration and allocation of gas from gas wells which will be considered by the Railroad Commission at a hearing which has been called for nine a.m., December 9th, at the Commodore-Perry Hotel, Austin, Texas". Now, we will proceed with Case 407.

MR. SPURRIER: Mr. McKellar.

MR. MC KELLAR: Mr. Spurrier. As a member of the committee that the Commission has appointed to study this matter the committee held a meeting in Lovington this past Monday which was a most inconvenient date in my - - for me, because I couldn't attend. I didn't see the notice of the meeting until Friday and because of previous arrangements I couldn't be there but I had a representative and there is a misunderstanding between myself and certain others of the committee as to what our mandate from the Commission is. There has been various arguments injected into the committee's 40 acres versus 80 acres and vice versa back and forth and my understanding of the mandate was that we were to adopt a proposed recommendation. The Commission had, on its motion, taken a case under advisement. At least for my personal benefit, if I am to serve as a member of the committee with any value at all, I wish that the Commission would reissue in more detail form the mandate to the committee members. I understand that a wire has been sent to the Commission by the Chairman of this committee to the effect that it was unaminously agreed that the case be continued. My representative had no such authority to agree to any such continuance. He tells me that he did not knowingly agree to any such continuance, so there is obviously a misunderstanding although I am sure it was in good faith between the Chairman of the committee and Magnolia's representative.

This case has been carried on this Docket this is the third

month. Aside from my duties as a committee member and speaking now only on behalf of my client, Magnolia Petroleum Company, we want the case brought before the Commission at the earliest possible date and I am now on my feet here today to make certain recommendations on behalf of my company. We feel it is our opinion that any 80 acre spacing order, temporary 80 acre spacing order, along the lines of that proposed by this Commission should embody certain sections. One of those is that the order should be effective at the depth of 10,000 feet which the Commission proposed. Number two is, if you remember when I was here three months ago to discuss this matter, I was of the firm opinion that no time limit should be placed on this proposed order, that it should, the criterion should be five wells. After going into the matter at some length and discussing it I realize that such a proposal could be abused by operators to the injustice and prejudice of other operators and possibly royalty interest. So I now make my recommendation and would like to recommend to the Commission that this proposed order be for a period of 18 months or five wells, whichever should occur sooner, so that no operator could drill four wells and simply sit back. Of course, realizing that in 18 months if we had only drilled two wells an operator could come in and ask for further continuance of the temporary order and that matter could be heard on its merits but I think in all fairness to the royalty owners and the other operators that an 18 month time limit is reasonable. That is hard work for me to say since I have told George Graham I thought

it was highly unreasonable. I want to tell you, George, I have come around to your line of thinking. I was wrong about it. The third essential that I think the order should embody is that these wells be placed on a fixed spacing pattern, placed in diagonal quarter sections with possibly the discovery well setting the pattern. Now, I have a proposed temporary 80 Acre spacing rule which is not original with me. I discussed the points that my company thought should be embodied in such a rule with a great many operators who were present here in Santa Fe, practically all I could contact. I discussed this plan with them and we changed it from time to time and I would like to read into the record a suggested Statewide Rule that our company agrees with and then I would like to submit it to the Commission Staff for their study. I will read this, it will just take a moment. First paragraph,"After the effective date of this order, no operator in a new reservoir established as a result of the completion of a wildcat well at a depth range of 10,000 feet or more shall drill more than one well to each 80 acres." Second paragraph, "The location of the discovery well shall set the pattern for the location of additional wells drilled while the temporary 80 acre proration units are in effect. Subsequent wells drilling to the same reservoir shall be located withinin 150 feet of the center of a quarter quarter section of identical description to that quarter quarter section in which the discovery well was drilled or within 150 feet of the center of a quarter quarter section diagonal to such quarter quarter section. Each

quarter section shall be divided into two proration units, running either north and south or east and west." Paragraph three, "Upon the completion of five wells to the same producing formation within a radius of two miles of such wildcat well or within eighteen months after the completion date of the discovery well, whichever shall occur first, a hearing shall be set for the purpose of determining whether or not 80 acre spacing should be continued in effect." Fourth paragraph, "Certified plats of proration units shall be filed with the Commission and such other provisions as may properly be included therein, as supported by proper testimony and evidence adduced at said hearing."

I would like to submit this not for an exhibit but just for the Commission's consideration.

In summing up my remarks, Mr. Chairman, I would like to urge the Commission to, as I say, issue a new mandate to the committee urging upon the Chairman to call the meeting at least a week ahead of the next statewide hearing. We have the Oil and Gas Association coming up in Albuquerque the first of the month. It may be that we can meet in conjunction with that hearing for a short time or at some other time, but at least enough time to where we can meet with the committee and take its recommendations back to our clients. Along with that mandate I think it would be well if the Commission, if their staff have any definite thoughts, which I am sure they have on this matter, to submit a proposal, a proposed rule to the Committee and ask the Committee for their recommendations and considerations of that

proposed rule.

That is all I have to say. If there is any question that anybody has as to what my company's position is in the matter I will be glad to answer them.

MR. SPURRIER: Does anyone have a question of Mr. McKellar? Anyone else to be heard in this case?

MR. HILTZ: R. G. Hiltz, with Stanolind. Our original thoughts on the question were submitted by letter to the Committee. It was our letter from Mr. C. F. Bedford, dated October 20, 1952, filed RGH 5247-175. I would like to request that letter be made a part of the record of this case. Our original thoughts differed very slightly from the rules which were proposed by Mr. McKellar but I would like to state that we have now reviewed the suggested rule and we are in full accord with the suggestion as read into the record. In addition I would like to point out that since the rule would operate in any case on a temporary basis I fail to see how it would adversely affect any of the interested parties. It simply means in the early stages of the development of the field we could be assured of an intelligent, uniform manner of development until sufficient data became available to determine the optimum spacing pattern for the complete field development. Prior to making a decision in this case we could acquire the necessary facts to support the right conclusion. We feel that this is a realistic progressive development in conservation in New Mexico and we strongly urge the Commission to adopt a rule of that sort.

MR. KELLAHIN: Mr. Kellahin, Phillips. Mr. Chairman, I attended the meeting of the Committee that Mr. McKellar referred to,as an alternate member. I would like to second his statement made as a result of that Committee meeting. There was considerable confusion as to the purpose of the Committee and discussion seemed to center around the merits of 80 acre spacing. I would like to second the recommendation that the Commission issue a little - - further clarify its instructions as to what is desired of the Committee if it is to continue to function. Also, Mr. McKellar stated that the telegram that was sent by the Committee Chairman said it was a unaminous request that the hearing be continued or postponed and that was certainly not my understanding of the results of the meeting. The representative of Magnolia certainly did not agree to the postponement, nor did I.

MR. SPURRIER: Thank you. Before we go any further I probably should have read this to begin with. This telegram that is in question or has been mentioned here, sent to the Commission by G. T. Hanners, acting Chairman. "Your Committee on spacing, Case No. 407, met at Lovington Monday morning, 17 of November, with Committee members Leonard Christy, Dan Glidden and Hanners present. Wally J. Ford, Magnolia engineer present in behalf of Committee member McKellar. Mr. Kellahin , attorney, present in behalf of Committee member Foster and W. Glen Staley, of Operators Committee, and DuPont of U.S.G.S. and with representatives of New Mexico Educational Association and other interested

parties present. Importance of the case and complexity of questions will require additional time for preparation and submission of Committee report and recommendations. Your Committee recommends, unaminously, postponement of November 20 hearing and resetting the case for a later convenient date".

There are people here prepared to testify today and although this telegram, the meaning of the telegram, is not quite clear to me. I assume that they mean that the case should be continued rather than the testimony should not be presented today. Therefore, the Commission will take any testimony that you may be ready to present. Are there any other members of the Committee present? Mr. Christy.

MR. CHRISTY: I am also a member of the Committee and attended the meeting as the telegram indicates. I did agree to a continuance, in hopes that the Committee might get together with some kind of a proposal. I might add it would be a hope on the thing. I believe, however, that if the Commission is going to take this under advisement I would concur in the proposed rules as given by Mr. McKellar, and urge their adoption. The Committee was asked - - the Committee charged a few members of the Committee, the engineering members particularly, to propose these rules and I have discussed the rules with two other members of the Committee, the representatives of the Engineer Department, and I am reasonably sure that these are the rules that the Committee would propose. Whether all the members of the Committee will agree to it or not I can not answer that be-

cause they haven't all seen them. I certainly urge the adoption of the rules given by Mr. McKellar.

MR. SPURRIER: Anyone else?

MR. FOSTER: Mr. Foster, representing Phillips Petroleum Company. We have already had the report of Mr. Kellahin who attended the Lovington, New Mexico meeting. My representative placed on the Committee. Of course, Phillips Petroleum Company came here prepared to put on some testimony this morning. We have witnesses and we would like the opportunity to do that. I might add that we are very much in accord with the suggested recommendations made by Magnolia on the rule. I believe that these suggested changes in the rules meets with the general approval of all the operators and perhaps before the meeting is over all the operators will have expressed themselves on the matter. When I got the letter appointing me as a member of that Committee I viewed the letter as requiring the Committee to consider the suggested temporary 80 acre proration unit order on the basis that it was assumed that the Committee or that the Commission was considering the adoption of such an order. I did not understand that the Committee would go into any discussions of whether you should or should not have 80 acre proration units established in the State of New Mexico. As far as I am concerned I think it would be a useless procedure to have the Committee consider the question of whether you are going to have 80 acres or 40 acres. Further I think it would be contrary to what the established policy of this Commission

already is because the Commission has granted 80 acre units; there are four of them in effect in the state now. I take it that the purpose of the Commission in appointing this Committee was simply to find some workable way to implement the policy of the Commission that had already been established by way of the granting of applications for 80 acre proration units. As far as I am concerned I just don't want to get into any argument now, as a member of that Committee, on the question of 40 acres versus 80 acres. The Committee can't decide that. It seems to me that the letter that the Commission sent out, the letter that you, Mr. Spurrier, sent out, was perfectly clear that we were to proceed on the theory that we were to discuss only the proper sort of order that should be made establishing 80 acres. If that isn't clear I want to add my voice to that of the Magnolia representative that it be made clear to this Committee what their functions are, so that if we do have another meeting there won't be that chance or opportunity of argument between members of the Committee as to what they are to do. Now, whenever everybody else gets through expressing themselves about this matter I want to put on a little testimony about this matter.

MR. SPURRIER: I think I might help the status of the record if I would read the proposed Rule 407, as we proposed it some time ago. "One, temporary 80 acre proration units are hereby established for wildcat wells as defined in Rule 104A completed as oil wells with a pool depth range of 10,000 feet or more, determined in accordance with Rule 505A. Two, after the effective

date of this order no owner of a producing well completed as a wildcat with a pool depth range of 10,000 feet or more shall be required to drill more than one well to each 80 acres in order to secure his proportionate part of the production. Upon completion of five wells to the same producing formation within a radius of two miles of such wildcat wells the proration units shall be established at 40 acres unless the operator can establish by clear and convincing evidence that one well will efficiently and economically drain the 80 acres assigned to the well. And such other provisions as may properly be included therein as supported by proper testimony and evidence adduced at the said hearing."

I might say that we, the Commission, appointed this Committee. They were appointed to advise the Commission on this proposed rule. The Commission realized that the question of 80 versus 40 acre spacing was a part of the thing at hand but we did not intend that the Committee should report to us whether they recommended 40 or 80 acre spacing. We intended that they report to us or recommend to us on this proposed rule. On matters of depth specifically I set out in my letter at what depths should order be effective, how many wells should be drilled before the hearing is called and should there be a time limit for the date of the hearing.

MR. GRAHAM: Was it not also your idea, Mr. Spurrier, that there probably would be a majority report and a minority report, that we might have both sides?

MR. SPURRIER: I wouldn't say that I thought there probably would be, I thought there was a possibility there would be.

MR. ADAMS: Mr. R. E. Adams, Cities Service Oil Company. As I understand the proposed rule by the Commission, that wouldn't fix the 80 acre spacing pattern for the field. As I understand Mr. McKellar the recommendation of the Committee would. In other words if you drilled a discovery well below 10,000 feet you wouldn't offset that discovery well under the Magnolia recommendation, is that correct?

MR. SPURRIER: That is the way I understand it.

MR. MC KELLAR: That is correct but that is not the recommendation of the Committee. That was entered. That is, I am speaking only for Magnolia Petroleum Company. I said they weren't original with me. I have discussed them with a good many operators. That is not a Committee,that is neither the Majority nor the Minority Committee report. That is something I have entered on behalf of Magnolia. You are correct, you could not, unless because of the data that you received from drilling your discovery well, come in and ask that your discovery well be declared an exemption under the rule and then drill a 40 acre offset and throw your discovery well out for your later deliberation. The attorney put that in because you come up here after locating the proration units and you drill five wells and you have 40 acre wells.

MR. ADAMS: Not necessarily.

MR. MC KELLAR: Not necessarily but it often happens. I realize by having the definite step out and I realize it is highly controversial, it was the thought of my company that it would force an operator if he wanted 80 acres, if that is what he wanted.

MR. ADAMS: An operator might not want 80 acres if he drills a discovery below 10,000 feet. I think that a reasonable operator would offset that well. We have done it down here and we will do it again.

MR. MC KELLAR: That is a point to be considered, the Commission's original proposed rule did not say can not, it said "will not have to", or words to that effect.

MR. ADAMS: That is the way I understood the proposed rule.

MR. MC KELLAR: My proposal on behalf of Magnolia differs from that. That is not a Committee recommendation it is just my --

MR. ADAMS: (Interrupting) Cities Service wishes to go on record as opposing the Magnolia proposal for discovery well on 80 acre spacing. If we go below 10,000 feet we want the permission to offset that well on 40 acres if we so desire.

MR. SPURRIER: Anyone else?

MR. SHAVER: Charles Shaver, representing the Humble Oil and Refining Company. We concur in the proposed rule submitted by Mr. McKellar and also his recommendations. We feel that these rules are not only proposed rules, not only appropriate

but adequate and we would like to urge the Commission to adopt the Statewide Rule along these lines.

MR. SPURRIER: Anyone else?

MR. BALLOU: My name is Ballou, representative from the Sun Oil Company. We went on record in September as favoring the proposal of the Commission. The feeling of the Sun Oil Company that the proposed 80 acre rule suggested by Mr. McKellar would bring about orderly development and also permit a more rapid delineation of a new producing reservoir. We favor the proposal.

MR. SPURRIER: Anyone else?

MR. RAY: Carl Ray, with the Texas Company. We have expressed our views on this proposed order to the members of the Committee. The proposal of the Magnolia Company essentially embodies our proposals in this matter. We are especially desirous of having the fixed spacing provision in that order and we wish to urge the proposal of the Magnolia Company be seriously considered by the Commission in writing such an order.

MR. SPURRIER: Anyone else?

MR. ADAMS: Cities Service is not opposed to 80 acre spacing below 10,000 feet but we do feel that an operator that drills a discovery well should have the option of making the next location as he sees fit. The 80 acre step out, I don't know how many feet that would be, it would be well in excess of 660.

MR. MC KELLAR: 660. No, it would be 1800 and some feet with the next step out, I think. We would like to make a direct

offset to the discovery well.

MR. SPURRIER: Anyone else?

MR. WALKER: Don Walker, with Gulf. We would like to go on record as concurring with the proposed rules as recommended by the Commission and as modified by the statement in the suggested changes as read by Mr. McKellar.

MR. SPURRIER: Anyone else?

MR. CROCKER: J. H. Crocker, with Mid Continent Petroleum Corporation. In view of our interpretation of the statutes of New Mexico we think that the Commission is rightfully on its own motion made a suggestion for consideration with respect to this temporary 80 acre proposition. We wholeheartedly support the position as taken by Mr. McKellar with respect to the points made by Mr. Adams. We feel that any operator if he wants to directly offset the wildcat that came in on 40 acre pattern this Commission is always open to applications for exceptions. As I understand this Commission has no authority to require wells to be drilled on a density that is more than necessary for adequate drainage. If one well will adequately drain 80 acres and the Commission agrees with that position it has just one position it can take and that is to authorize a stand back of 80 acre spacing. I think until that question of changed conditions that the pattern that can adequately be drained, the largest pattern is the one that the state should adopt and we agree with the positions that have been taken.

MR. SPURRIER: Anyone else?

MR. HOWARD: R. E. Howard, with Atlantic Refining Company. We would also like to concur with proposal submitted by Mr. Mc Kellar on behalf of Magnolia Petroleum Company. I believe that at the September hearing we went on record at that time as favoring temporary 80 acre spacing for wells below 10,000 feet. We would like to concur with the rules as, the proposed rules as submitted by Mr. McKellar.

MR. SPURRIER: Anyone else?

MR. GRAY: Ralph Gray, of Buffalo Oil Company. Our company would like to see some type of temporary 80 acre spacing program adopted. We ourselves have spent close to half a million dollars drilling one of these deep wells and we don't see how even a major can drill those kind of wells indiscriminately. I would be inclined to with-hold recommendations as to the exact spacing program that should be followed until this Committee has its final say. I think that the Committee should, if they're going to continue to study this problem, should put their stress on determining if it is feasible to have anything other than just a strict diagonal spacing pattern adopted, so maybe they can come out with something that will be a little more satisfactory along that score.

MR. SPURRIER: Anyone else?

MR. SELINGER: If the Commission please I would like to point out a couple of matters in connection with this rule. First I would like to point out that this is the third month this matter has come up. It came up in the September, October

and November hearings. I believe that in the September and October hearings the matter of 40 acre versus 80 acres was at least given an opportunity to all express their views. Secondly I would like to point out that in connection with the suggestion made by Mr. Adams of the Cities Service that the difference between a diagonal and direct 40 acre offset is a difference between 1300 and 2000 feet and 1870 feet. I think comparatively speaking it is an inconsequential footage, you're going to a deep hole test. I would like to say in defense of the Commission, if they need any, I think their letter directed to this Committee was as clear and concise as anything possibly could be because attached to that was a proposed order of 407 which deals exclusively with 80 acres and the three questions propounded to the Committee in the form of instructions propounded by Mr. Spurrier are also definite and clear. I imagine the purpose of the letter of December 24th as compared to the proposed rule heretofore in the September and October hearings was the fact that there was no time element in the original proposed 407 Rule and the Committee was instructed to discuss that time element question. The suggestion of the Statewide Rule as proposed this morning, insofar as Skelly Oil Company is concerned, meets with our approval. There seems to be some question as to whether or not the Commission should go ahead with testimony this morning on this matter or not. It would be, I think, poor judgement to allow a portion of testimony to go in now and leave it hanging, dangling, until a continuation of the hearing and it is our suggestion that after

all the views are expressed that the matter be set over to the December hearings, let the Committee as appointed re-read Mr. Spurrier's directions of September 24th in connection with the Rule 407 as attached to that letter, let the Committee come back at the December hearing, make its suggestion and then the entire matter can be decided with the conclusion of testimony at that hearing.

MR. SPURRIER: Mr. Dailey.

MR. DAILEY: Perhaps some of the members are opposed to 80 acre spacing and that they think that by writing any rule like this it would be favoring something that actually they are opposed to. In other words it would put them in a position where they could present a Committee report that is a workable rule and it would prevent them from testifying against the adoption of such a rule.

MR. SPURRIER: Anyone else?

MR. MC KELLAR: I would like to, in defense of the Committee members that differ with me, that are not here, I would like to point out that it is perfectly feasible for reasonable minds to differ on anything that is written down. If it was not we lawyers would be hard pressed to making a living. We would have to go back to engineering.

MR. SELINGER: That may be the trouble of the oil business today.

MR. MC KELLAR: Those men are conscientious as well as Christy and Foster and myself in wanting to represent the clients

and serve the Commission. We simply disagree among ourselves as to what the instructions were. We read those things more than a casual glance, I am sure. I do want the Commission to give us something else to work on or discharge us as it is we didn't agree on the - - what the mandate is. We read those things.

MR. SPURRIER: Incidentally, I don't know that it is a point that is too serious but the Governor could not be here today because he had a meeting of the Canvassing Board. Does anyone else have a comment in the case? As far as the Commission is concerned anyone that cares to put in testimony in this record may do so, the choice is yours. If you want to take Mr. Selinger's suggestion that is up to you. If you do not we are ready to take the testimony.

MR. FOSTER: This case will be heard in December, will it not?

MR. SPURRIER: The Commission said it will, December 16th we will continue the case to that date for receiving further testimony and/or the recommendations of this Advisory Committee.

MR. FOSTER: I came here, of course, prepared to put on some testimony. I didn't know about this telegram until I got here. I brought a witness here but I don't want to take up the Commission's time to do it when it might not be as effective as if we waited until the December hearing.

MR. SPURRIER: Judge Foster, only as a suggestion I mention the fact that Governor Mechum could not be here.

MR. FOSTER: Yes.

MR. SPURRIER: Perhaps you would like to have a full Commission hear this case.

MR. FOSTER: I would indeed, I would like to have a full Commission because we would just have to repeat it again so that everyone would know what the record is. I realize that some members of the Commission don't have time to read these records.

I believe as far as Phillips is concerned we will just not put on any testimony now if that is really going to be set for hearing on the 16th of December. Is the fact that you're going to set it does that include a statement that in all probability it won't be continued again.

MR. SPURRIER: I don't believe we could rule on that, Judge, it depends upon the testimony and the recommendations of that Committee, I suppose.

MR. FOSTER: Of course it is obvious to me that if the Committee members are going to maintain the attitude that they have about what their directive is from this Commission that you're not going to get any report out of this Committee that is going to be of any help to this Commission or anybody else. So, I just wanted to get that in the record. I like to look at these things realistically, not just be kidding myself here about anything. We are very much in earnest about this temporary 80 acre rule. As far as I am concerned personally and as far as Phillips Petroleum Company is concerned we just can't see how anybody could have any reasonable objection to a temporary rule. Certainly

no one would contend, it seems to me, that if one well will adequately and economically drain 80 acres that you ought to drill two wells on it. I just can't find any basis in my reading or thinking for anybody to be opposed to a temporary order. In view of that it seems to me that the only question to be considered is just what kind of a temporary order you are going to have, not whether you are going to have one or not. That, I thought, was to be the function of the Committee. If the Committee can get together and discuss that thing I am sure, on that basis, I mean, if we could get all the Committee members to approach it on that basis it seems to me we ought to come up with some recommendations. Maybe we will be divided numerically three and three on some matters, four and two on others, and five and one on others. It seems to me that this Commission will now make it clear to all members of this Committee that they are not to consider whether we are going to have 80 acre temporary order or not but what kind of an 80 acre temporary order we are going to have. Maybe three of us here who represent these predatory interests will be able to convince the other members of this Committee that they ought to sit down across the table with us and discuss a problem that is in my opinion and in a lot of the operator's opinions of a very serious nature to the real interest of the State of New Mexico. This isn't any laughing matter. I believe that if you can get a fellow to listen to you long enough you can make a little headway sometimes. Sometimes it seems like you have to get him to listen too long but in any event I believe that with the help

of the Commission now and directing these other members and asking them to call it within a reasonable length of time too -- the matter has dilly dallied along here for nearly 60 days before they called a meeting. They didn't consult with anybody as to what would be their convenience about a date, they just set it down and said "You be there". It just so happened that some of us could not be there because of previous committments. I believe that we should take all these things into consideration and make one more effort here to see if we can get something out of this Committee and maybe it might be of some help to the Commission. On that basis as far as Phillips is concerned we will just forego the presentation of any testimony at this time but I don't want to be understood as agreeing to any more continuances of this thing. We would like to get it heard. It looks like 90 days ought to be long enough.

MR. SPURRIER: Anyone else? I might say, in line with the Judge's suggestion, that I believe the Commission's letter instructing the Committee is pretty clear.

MR. FOSTER: I think it is crystal clear. I don't see how anybody could misconstrue it but apparently they did.

MR. SPURRIER: Anyone else? If not the case will be continued to the definite date of December 16, the next regular hearing.

MR. BALLOU: Before you go on that, Mr. Spurrier, the Sun Oil Company is still in the process of attempting to complete the well we mentioned at the September hearing. We hope sometime to

to be able to complete that well. It would be considerable help to Sun Oil Company to know whether we are going to have a diagonal rule or whether you can offset on the next 40 or what kind of rule you are going to have. We would like to urge that this thing be brought up and decided on at the December 16th hearing, so that we will know how to proceed with development if and when we complete this well. We think that the proposed rules are reasonable and it is something that everyone can abide by, if it is later proven that one well will not drain 80 acres you can go back to 40. Once you drill on 40 you can't undrill and put them on 80's.

MR. SPURRIER: Anyone else?

MR. BROWN: Brown, with Sun Oil. I have come to all these meetings and I have yet to find out who we are arguing about. It seems that everyone that comes says we want the rule. We just keep continuing. Nobody is objecting very seriously to anything. I would like to know if it is the wind we're fighting or what?

MR. SPURRIER: Mr. McKellar, would you like to answer his question?

MR. MC KELLAR: I don't want to seem as Mr. Moderator. I am not representing Mr. Hanners under any circumstances. No, seriously, I think possibly one reason that the opposition is not actively here is because working through their Committee members they are laboring under the impression that the matter will be continued. The Chairman submitted the recommendations

to the Commission and I certainly think in all fairness to those people that the Commission has no alternative other than to continue the matter. The first month we realized that such a controversial problem could not be decided, then the Commission appointed a Committee and the Committee Chairman recommended that the thing be continued to this time. The word went out and so the opposition, if that is the way you want to speak of it, at least the ones that probably are not here because of the fact that the Committee was appointed and their representatives on the Committee probably told them that it was recommended that the matter would be continued. There are some that oppose it.

MR. SPURRIER: Anyone else? We will take a five minute recess.

(Recess.)

STATE OF NEW MEXICO)
:
COUNTY OF BERNALILLO)

I HEREBY CERTIFY that the foregoing and attached transcript of hearing in Case No. 407 before the Oil Conservation Commission, State of New Mexico, at Santa Fe, on November 20, 1952, is a true and correct record of the same to the best of my knowledge, skill and ability.

DATED at Albuquerque, New Mexico, this 29th day of November, 1952.

Ada Dearnley
REPORTER

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

BEFORE THE

OIL CONSERVATION COMMISSION

JAN 12 1953

STATE OF NEW MEXICO

CASE 407: (Continued successively since September 16) The Commission's motion for extension of Section 'G', Oil Proration and Allocation, to provide for addition to Rule 508, Establishment of Temporary 80-acre Proration Units.

TRANSCRIPT OF HEARING

December 16, 1952

BEFORE: Hon. Ed. Mechem, Governor and Chairman
Hon. Guy Shepard, Land Commissioner and Member
Hon. R. R. Spurrier, Director and Member

STATE OF NEX MEXICO

ss

COUNTY OF BERNALILLO

I HEREBY CERTIFY That the within transcript of hearing in the above styled case before the Oil Conservation Commission of the State of New Mexico is a true record of the same to the best of my knowledge, skill and ability.

DONE at Albuquerque, New Mexico, December 20, 1952.

E. E. Greeson

E. E. Greeson
Reporter

MR. SPURRIER: We will move on to Case 407.

(Mr. Graham reads the notice of publication.)

MR. SMITH: May it please the Commission, I am J. K. Smith of the Stanolind Oil & Gas Company.

I would like to suggest to the Commission this matter be continued for ninety days or to the March hearing. It has occurred to me that the most significant type of data to get with respect to the feasibility of 80-acre spacing or 40-acre or 20 or whatever it may be is reservoir performance. And perhaps the Commission might like to give some consideration to any interference tests which may be run during the interim period before March to determine whether or not the evidice is consistent with that which was developed at the Fowler Pool hearing which we put on. We would like to make that suggestion and ask that the hearing be postponed until the March hearing.

MR. SPURRIER: That is your motion?

MR. SMITH: Yes, sir.

MR. SPURRIER: Anyone else have a comment? Does anyone have an objection to counsel's motion for a continuance to March? Without objection, the case will be continued until the regular March hearing.

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BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICOO

Santa Fe, New Mexico
March 17, 1953

TRANSCRIPT OF HEARING
CASE NO. 407

ADA DEARNLEY & ASSOCIATES
COURT REPORTERS
ROOM 12, CROMWELL BLDG.
PHONES 7-9645 AND 5-9546
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

March 17, 1953

In the Matter of)
)
Case No. 407.)

TRANSCRIPT OF HEARING

MR. SPURRIER: The next case on the docket is case 407.

(Notice of Publication read by Mr. Graham)

MR. SPURRIER: Is there anyone here in case 407? If not, I guess I will have to dismiss it.

MR. McDOWELL: It was our understanding it was to be continued until the April hearing.

MR. SPURRIER: I don't believe our records show anything to that effect.

MR. SMITH: I make a motion that the case be continued.

MR. SPURRIER: Any objection to Mr. Smith's motion? Mr. Foster, did you wish to say something?

MR. FOSTER: E. H. Foster, representative of Phillips Petroleum Company. I am advised that the Governor couldn't be here for the hearing today and that the case would be continued. I don't know whether my information is wrong or not, but that is a statement for the record for whatever it is worth. I certainly don't want to see the case dismissed.

MR. SPURRIER: Very well, it is apparent that the Governor

is not here and Mr. Smith has made a motion to continue. Without objection that is what the Commission will do. The case will be continued to the regular April hearing, April the 17th.

REPORTER'S CERTIFICATE

I, ADA DEARNLEY, Court Reporter, hereby certify that the foregoing pages, numbered 1 and 2, constitute a complete and accurate record of the proceedings before the Oil Conservation Commission of New Mexico, in Case No. 407, on March 17, 1953, to the best of my knowledge, skill and ability.

Ada Dearnley
REPORTER

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

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

CASE 407

The Commission's motion for extension of Section 'G' (Oil Proration and Allocation) to provide for addition of Rule 508, Establishment of Temporary 80-acre Proration Units.

TRANSCRIPT OF HEARING

June 16, 1953
Date

BEFORE: Honorable Ed. L. Mechem, Governor
Honorable E. S. Walker, Land Commissioner
Honorable R. R. Spurrier, Director, OCC

STATE OF NEW MEXICO)
ss
COUNTY OF BERNALILLO)

I HEREBY CERTIFY That the within transcript of proceedings before the Oil Conservation Commission is a true record of the same to the best of my knowledge, skill, and ability.

DONE at Albuquerque, N. M., this 3d day of July 1953.

E. E. Greason

My Comm. Ex.:
August 4, 1956

E. E. Greason
Notary - Reporter

COM. SPURRIER: We will move to case 407.

(Mr. Graham reads the advertisement.)

MR. SMITH: May it please the Commission, as I understand the status of this case, it having been continued from the April hearing, I believe that Mr. Tesch -- was he on the stand or was there additional testimony offered at the conclusion of his testimony?

COM. SPURRIER: As I remember, Tesch was on the stand.

MR. SMITH: I should like to inquire if the Commission has information as to whether or not Mr. Tesch is back for this hearing.

COM. SPURRIER: The two senior members of the Commission tell me Mr. Tesch finished his testimony so that he wouldn't have to return.

MR. SMITH: I had to leave early and I wasn't too sure what the status was.

I presume that the Commission has received no information as to whether or not Mr. Tesch has returned? He indicated he might not be able to return. I presume you have received no information from him?

COM. SPURRIER: No, sir, we haven't.

MR. SMITH: In the interests of saving time, in view of the presentation we wish to make, we divide the presentation off somewhat among the companies, and I believe

Judge Foster is the one who is supposed to proceed.

(Off the record)

MR. SMITH: Is Mr. Hanners here?

COM. SPURRIER: I don't see him, Mr. Smith.

MR. SMITH: Shall we proceed?

COM. SPURRIER: If you wish.

MR. FOSTER: We ask the witnesses be sworn, if it please the Commission.

COM. SPURRIER: Will you ask them to come forward?

(Witnesses sowrn)

MR. FOSTER: May it please the Commission, I am E. H. Foster, representing Phillips Petroleum Company.

The three industry members who were on the Advisory Committee wish to submit a report at this time of the Committee. I have some extra copies here of the report, if the Commission would like them. And I will offer one in evidence. I would just like to read this report of the Committee.

(Reads the report)

MR. FOSTER: Now, I would like to offer that report as part of the record.

COM. SPURRIER: Is there objection?

MR. MACEY: I would like to ask the judge a question. You might have misread. You said unless in 18 months. You meant not more than 18 months?

MR. FOSTER: Yes, I did misread. I did misread.

Thank you.

COM. SPURRIER: Without objection, it will be received.

MR. FOSTER: I would like the unanimous consent of the Commission to excuse Mr. Beall, who is our vice-president, immediately after he testifies so that he may get back to Bartlesville. Mrs. Beall is very seriously ill, and will undergo major surgery early in the morning. And Mr. Beall is anxious to return to Bartlesville as soon as he possible can.

COM. SPURRIER: Very well, judge.

MR. FOSTER: And we will call Mr. Beall as the first witness.

K. E. BEALL

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. FOSTER:

Q Will you state your name to the Commission, please?

A K. E. Beall.

Q Where do you reside, Mr. Beall?

A Bartlesville, Oklahoma.

Q Are you employer by Phillips Petroleum Company?

A Yes, sir.

Q What official position do you hold with the company, Mr. Beall?

A Fice-president of the Economics Department.

Q How long have you been in that capacity?

A About six years.

Q Now, Mr. Beall, you have made some studies of the economic implications of well spacing, have you not?

A Yes, sir.

Q And would you say that an economic analysis is important in the oil business?

A Yes, sir, I would say it is very important. As far as I know no company that is going to spend very much money does so without such an analysis. I presume that probably most of the people that appear before this Commission represent the branch of the industry that spends the money. And I would be glad to give you a few slants from the branches that get the money, and determine how it is spent and how.

Q Will you do that, please?

A Yes, sir. I presume most of you realize that the oil industry is one of the four or five major industries of our country. It has gross assets of approximately 40 billion dollars. And it is required this industry each year spend a great deal of money in new capital. For the past five years there has been substantially 15 billion dollars spend in capital expenditures of various branches of the oil industry. And during 1952 the best estimate we can make this early is that approximately thirty billion dollars was spend for capital expenditures. And, inspite of anything anybody

may say the oil industry, as well as allother industries, spends only when it is satisfied it can make a return; get its money back with a reasonable profit.

In other words, we are part of the capitalistic system, whose purpose is to make money. So that in determining how this staggering amount of three to three and a half billion dollars is spent each year, the various companies who spend it have to make very careful analysis of where to put the money. There is of course competition between the various branches of the oil industry for capital.

We have the refining industry, and the production industry, and the transportation and marketing, and of late years the petro-chemical branch; all clamoring for part of this capital expenditure.

Of recent months you are probably aware of the fact interest rates have increased materially. And I am sure for at least the immediate future it is going to be harder to get capital to spend than it has been in the past. Therefore, the analysis of how to spend this money is even more important in the present and in the immediate future than it has been in the immediate past.

Now, once the company determines what portion of its total capital budget is to be allocated to the producing branch, then it immediately becomes the problem of where to spend the money. In other words, the different states have to

compete with each other to get their proportionate part of the capital funds allocated to the producing branch. And, of course, there is also an allocation as between exploratory wells and wells to expand the fields already developed.

Now, the industry is faced with the constantly increasing dry hole hazard. If we take an analysis of all the wells that have ever been drilled, there is something over one million four hundred thousand of them. Approximately 25 per cent of these wells have been dry. If we take only the last ten years, something over 300,000 wells, 34 per cent have been dry. If we take just the last year, 44,000 wells, 40 per cent have been dry. So, you see there is a steadily increasing dry hole hazard. And, of course, it is needless to say you don't make money out of dry holes.

Now, in addition to this dry hole hazard, the costs of various kinds affecting the development program have also increased very materially. Going back to the time of our last crude price increase in 1947, labor has increased approximately 40 per cent; steel prices have increased 40 per cent; other materials 20 to 30 per cent. Income taxes are also up, and are very burdensome. So that you can well see that the companies, the departments of companies responsible for the investing of these capital funds, have to make a very close analysis in order to be sure they are going to get their money back, plus an adequate profit.

Q Have you made some particular studies of the economic implications of well spacing, and investment of funds by oil companies insofar as the State of New Mexico, individually, isnconcerned?

A Well, yes. Among other things, of course, we have determined -- we have to determine -- the reserves that are uncovered by development. New Mexico is one of the various states -- there are many producing states. New Mexico has reserves I think that place it in about seventh place. Texas, first; California, second; Louisiana, third; Oklahoma, fourth; Wyoming, fifth; Kansas, sixth; and New Mexico, seventh.

Now, in general, the industry has had a very good record in uncovering new reserves for the entire country at large. Despite the fact that the production and demand -- crude runs have increased steadily each year. And we find that the amount of new crude reserves which have been developed has increased steadily. At the end of each year we have had a little more reserves of crude oil than we had at the end of the previous year. And at the end of 1952 the crude reserves was the highest it has ever been. Approximately 28 billion bbls. That is in the United States alone. Proven reserves.

Now, the thing that is disturbing about reserves is the fact that it is harder and harder to find them and more costly

to find them. And that, of course, is one of the things that the whole industry is facing.

Now, I have made some curves, which I ask the Judge to distribute to the members of the Commission interested, that show some of the factors that have to be considered by the different oil companies in their determination of what to do with their capital and where to spend it. I have numbered these curves from 1 through 7.

The first curve sheet shows the new oil that is added per foot of exploratory drilling in the United States, and also by the exploratory well.

Now, in the process of determing reserves, the American Petroleum Institute Committee, from which these figures were taken, of which I happen to be a member, has three different categories for new oil that is added. You have, first, the reserves found by wildcat wells which prove productive. Then we have the reserves that are added by finding new pools; deeper pools in most cases in already discovered fields; and the third category of reserves that are added in old pools due to their extension, drilling of the wells that are expanding the proven area in the known pools.

Those three categories of reserves are added together, and averaged for five-year periods, or a five-year average, divided by the feet of exploratory wells drilled, and the number of exploratory wells, which gives the points on these

curves.

Q Will you explain those curves to the Commission.

A The heavy, solid lines show -- these figures are for entire United States -- the heavy line shows new oil added per foot of exploratory drilling. Starting back ten years ago we found that for every foot drilled by exploratory wells there was 164 bbls of new reserves added. That figure has steadily gone down with only one slight increase to a figure of 85 bbls at the -- in the latest five year period ending in 1952.

The dotted line shows the number of bbls per exploratory well drilled. And it has dropped also steadily from 579,000 ten years ago to 364,000 in the latest five-year period.

Those figures show very conclusively how hard it is to find crude. And that is despite the fact that we are drilling more wells than we ever have before, and drilling deeper and more expensively, and the industry is spending more money than before, and still not finding reserves as rapidly as we did in the past years.

That is one factor that has to be taken into account in the determination of spending of money for production.

Q Mr. Beall, I notice on this chart No. 1 that you comment on the statement that it is based on data compiled by the American Petroleum Institute.

A That's right.

Q Are you a member of that Institute?

A Yes, sir. These figures are taken from the annual report of the combined two committees. One from the American Petroleum Institute, which studies crude oil reserves; and the second, the American Gas Association, which studies the reserves of gas and of natural gas liquids included in the gas.

Q I understand in your studies of the economics of this question you have found some economic factors that are unfavorable in New Mexico, and some that are favorable. Is that true?

A Yes, sir, that is true.

Q Would you tell us first what factors you found in New Mexico -- that is, economic factors -- that are unfavorable factors?

A Chart No. 2 shows one of the factors. This has to do with average depth of exploratory wells in the United States and in New Mexico. We found out ten years ago, 1943, the average depth of an exploratory well in New Mexico was 2,834 ft, and in the United States, as a whole, was 3,812 ft. In other words, New Mexico was about 1,000 ft shallower than the United States average.

The trend has been up both for the United States and New Mexico. However, the trend for the United States has been up very gradually. In the ten-year period the average

depth of the total United States wells has increased only from 3,812 to 4,604, which is a relatively small increase for a ten-year period. On the other hand, with New Mexico starting out 1,000 ft. shallower than the United States average in 1943, it has increased much more rapidly to 6,203 in 1952; approximately 1,600 ft. deeper than the United States average. And the trend, as you probably realize, is going to continue, as we know from the activity that is currently taking place.

Now, that is one thing that New Mexico has to face that might be considered unfavorable in that it is definitely classed as a deep area. And as most of the deep wells are increasingly costly, it means that whoever wants to develop wells in New Mexico is going to have to be prepared to furnish the capital to drill these deep wells.

Q When you say unfavorable, you mean compared with other states when the company comes to a decision as to where they are going to invest their funds?

A That's right.

Q In developing the oil resources?

A That's right. New Mexico has to compete with the other states. A company has a budget of so many million dollars. It is going to determine where it is going to spend that in the light of possible returns on the investment in the different states, and in the light of producing conditions set up by the regulatory bodies in those states, or in some

few states where there are no regulatory bodies those states have a strike against them to start with.

Q Your testimony is directed at a composite picture of the industry, isn't it?

A Yes, sir.

Q You are not speaking of any particular company?

A That's right.

Q But this is the over-all composite picture of the economic factors involved in the investment of funds by the oil companies?

A The entire industry, yes, sir. The only chart which I have which is limited strictly to Phillips Petroleum Company figures is the No. 7, which I will get to later.

Q Now, what other unfavorable economic position did you find New Mexico in?

A Well, Chart No. 3 shows the ratio of crude oil reserves to annual production. It shows conclusively that the State of New Mexico has not succeeded in developing reserves in proportion to its production return as rapidly as the remainder of the country.

The dotted line shows reserve picture for New Mexico, and the solid line the total United States. It shows ten years ago New Mexico had 17 years reserves, based on the then rate of production, whereas, the United States had 13.3 years. During the ten-year period the United States

as a whole has fluctuated up and down, but pretty largely level. At the end of the ten-year period, or end of 1952, the United States still had 12.4 years supply, even at the higher rate of production in '52. On the other hand, New Mexico has dropped from 17 years supply ten years ago to 12.3 years supply. In other words, it was half again as high as the United States average ten years ago, and now it is below the United States average, and has been consistently for the last four or five years. So that shows there hasn't been the reserves opened up in New Mexico in proportion ot the increasing rate of take that there has in the United States at large.

That also might be deemed to be an unfavorable factor for the State of New Mexico.

Q Now, you have explained these unfavorable economic factors that exist in this state. Did you find some favorable factors ?

A Yes, fortunately I do. I go into Chart No. 4. Charts 4 and 5 pertain to exploratory drilling only. And they show -- Chart No. 4 shows the ratio of dry holes to oil wells among only the exploratory wells. And Chart No. 5 shows the percent of dry holes to total number of exploratory wells.

In both cases, New Mexico has a comparably better average than the United States at large. Ten years ago New Mexico was a little worse than the United States as far as dry hole ratio. It had eight dry holes to each oil well

drilled in its exploratory program, with the single exception of the year '46 when it had a bad year. The New Mexico average has gone down steadily, and for the past four or five years it has been substantially under the United States average.

And in 1952 the average in New Mexico was 3.4 dry holes for each oil well discovered, as compared to a United States average of 5.8. A little over half. So, that is very favorable to New Mexico.

Now, the percentage of dry holes to total exploratory wells is also very similar to the other curve. It shows that ten years ago that the percent was a little higher in New Mexico than the United States average, whereas today it is lower. Sixty-eight per cent of the exploratory wells are dry now as compared to 82 --

Q You are now referring to Chart five?

A Yes, sir, I am now referring to Chart No. 5. That also has taken place for a period of four or five years. And it conclusively proves that the exploratory program in New Mexico is quite as hazardous as else where. And, of course, that is favorable because nobody wants to get into a program of drilling dry holes.

MR. GRAHAM: To what do you attribute that, Mr. Beall?

A To Mother Nature, I would say.

MR. GRAHAM: Better methods of exploration?

A No, sir, I wouldn't say the methods of exploration have been any better in New Mexico than elsewhere. You have more productive area and have proved up more reserves -- not more reserves, but found a better ratio of dry holes to oil wells.

Another very favorable factor here -- those two curves applies only to exploratory wells. This next curve applies to the wells which are drilled in expanding the production found in these discovery wells, exploratory wells.

Q First, are these exploratory wells kind of in the wildcat class?

A They are wildcats.

Q They are wildcats?

A That's right.

Now we are talking about the kind of wells you are talking about applying your factors in the way of your spacing to.

Q Yes, sir.

A In other words, expanding the field found by the discovery exploratory well.

This Chart No. 6 shows that exclusive of the exploratory wells, naturally there would be a very much lower percent of dry holes, because you have already proved up the field, and it is a question of expanding it. This average has been

fairly level throughout the ten-year period. It started out in '43, 136 of a dry hole for each oil well in these pool expansions; and ended up the ten-year period with .40, or four-tenths or 40 per cent.

Now, that is the experience for the United States. Now, New Mexico is consistently all through the ten-year period -- has been less than the United States average. And for the last six years it has been approximately half the United States average. In other words, in expanding the production, productive areas, around the discovery wells in New Mexico, the experience has been that only half as many dry holes have been drilled as in the United States at large.

Now, that is a very good point to consider with regard to your spacing here. All through that period -- I think your 40-acre spacing went into effect sometime in the thirties. All during this period you had 40-acre spacing in effect.

Now, many opponents of the wider spacing program have claimed the fact that you had to step out a little further in the 40-acre spacing than you did in the 10 and 20 in effect in other pools would tend to make you drill unnecessary dry holes. That claim isn't borne out at all by these facts. Because here with New Mexico operating under 40-acre spacing throughout this entire period, and the United States as a whole certainly less than 20 acres on an average -- we don't know what the average is because there is no way to compute

it, but we do know it is substantially under 40 acres. All during that period the dry hole per cent was about half what the United States average is.

That would indicate that the 40-acre spacing, which through this period, certainly the earlier part of the period anyway, was far more of an innovation than the expansion from 40 to 80 is today, that that didn't result in an abnormal increase in dry holes. The only answer that could be given to that, I would say, would be that it tends to prove once you find a field in New Mexico your geologic formations are more dependable and predictable and extend over a little greater area than the rank and file of the pools found elsewhere.

That is distinctly a favorable factor to this state, and indicates the advantage which the state undoubtedly had in the wider spacing, its 40-acre spacing pattern in the earlier days; which, I presume, was put into effect to attract drilling capital in this state, which at that time was very remote from the market. That has worked very satisfactorily and advantageously. And now that your depth has out-distanced the depth in the other areas, it would seem perfectly logical you would maintain that advantage you have had there by stretching out a little favor wider spacing still, if conditions warrant it.

There is no contention you should automatically and arbitrarily extend 40-acre spacing to any other spacing

pattern. Just keep your minds open as to what the spacing pattern should be -- should be given to any particular field once the factors have been determined to intelligently analyze that situation.

Q Have you also compiled some more cost figures in deep drilling, comparable figures?

A Yes, sir.

Q That is illustrated by --

A Chart No. 7.

Q Chart No. 7?

A These figures, first, because it is difficult to compile industry-wide figures on costs of any nature, I have limited the figures shown in this chart to the experience of Phillips Petroleum Company, alone.

Q I want to emphasize again: the figures you have given on the previous charts, 1 through 6, generally, those are industry-wide figures?

A Absolutely.

Q Don't apply to any one company?

A No.

Q To all companies?

A To all companies.

Q Including Phillips Petroleum Company.

A The best figures we can get to apply to the industry as a whole. The reserve figures are taken from the American

Petroleum Institute Reserves Committee reports, and the figures on the number of wells and the footage drilled and all those statistics are taken from "World Oil ", which has consistently compiled those type figures over the years.

Q You might state what this petroleum institute is; what its purpose is.

A Of course, I am sure you are all familiar with the American Petroleum Institute as a whole. It is a body formed of all the producing elements of the industry; practically all the big and little companies belong to the American Petroleum Institute. And this Reserves Committee, which is a committee which was appointed many years ago, some 12 or 14 years ago, to analyze the reserve situation of the entire industry. The Committee is headed up by Dr. Fred Lokey of the Sun Oil Company at Dallas, and composed of some ten or fifteen members of the industry who specialize in reserves calculations; geologists and engineers. And they have hundreds of people serving on sub-committees who make studies of all the figures and all the wells that are drilled, and keep abreast of what the reserves situations is, both as to new wells and old wells.

Q And the information they compile is purely factual?

A That's right. It is published in annual report form. Here is a copy of the latest report, December 31, 1952. It is published annually by the American Petroleum

Institute. And in the last year or two we have expanded the cooperation of the American industry with the Canadian industry, and there are figures in here showing in a preliminary way the reserves of crude oil in Canada. And it is the intent and hope as the years progress we will have figures on Canadian reserves which are entirely comparable to figures on American reserves. Which can be added and compiled in statistical analysis just as readily as United States reserves.

Q You regard the figures you get through this Institute as entirely reliable?

A They are the best I know of that can be had.

Q Will you give us comparable figures on well costs at different depths?

A Yes, sir. These figures are composite results on 225 wells, none of which are exploratory wells.

Q No wildcats?

A No wildcats. These are on field expansion wells drilled in the New Mexico and West Texas area by Phillips Petroelum Company in '51 and '52. They are all of such recent nature that the costs are, you might say, up to date; fairly up to date. There have been some increases in costs in the last few months, but they are fairly up to date.

The curve to the left part of the chart under the derrick shows the increasing depth of the wells. The extreme

left side shows the shallow wells. And the extreme right side shows deep wells. It shows a 5,000 ft. well -- incidentally, the points on the curve, the little round circles, are the individual groups of wells at different depths. And the curve is averaged out as best we could at various points. It shows a 5,000 ft. well costs about $62,000. And 8,000 ft. well, $116,000. A 10,000 ft. well, $188,000. A 12,000 ft. well, $318,000. And a 13,000 ft. well, $381,000.

Now, of course, the wildcat wells cost far more than this. Many cost a half million or three-quarters of a million, and some in excess of a million. These are pool development wells.

Now, the curve on the right-hand side shows the increased cost in a little different form; increased cost of deeper drilling. In other words, the fartherest left point shows the cost per foot at the 3 to 4 thousand foot level. It shows it costs about $11 per foot at that level. You step the depth up from 4 to 5 thousand, and the cost is $15 per foot. From 5 to 6 thousand, it costs $16. a foot. From the 6 to 7 thousand foot level, $18 a foot. From the seven to 8 foot -- 7 to 8 thousand foot -- $20, a foot.

In that increment between 3 and 8 thousand it isn't nearly as rapid an increase in the cost per foot of drilling as there is subsequently as you go deeper.

From 8 to 9 thousand the cost jumped to $31 per foot. From 9 to 10 to $41 per foot. Ten to 11, $55 per foot. Eleven to 12, $65. And from 12 to 13, $72 per foot.

Well, that means obviously every time you add footage to these deep wells, you don't add costs at the average over-all cost per foot of the entire depth, but you add it at these increments which are very much higher. If you go down to the 15 and 16 thousand foot wells, as we are getting into, the cost is upward of $100 a foot for those depths. The 13,000 ft. well costs better than six times as much as the 5,000 ft. well. It is obvious if you are going to have the same return on your money and get paid out at the same profit on the 13,000 ft. well that you had on the 5,000 ft. well you have to have about six times as much oil. At least that much.

Well, unfortunately, we have found that as these horizons are developed at the deeper depths they aren't necessarily better in every respect, or in any respect in some cases, than the shallow ones. In fact, to date the best producing horizons are still the shallower ones. If we have a pool that -- a horizon -- that produces at a depth of about 5,000 ft, you might say 2,000 bbls per acre would be the bare minimum at which you could afford to drill the wells. If you found identically that same formation at 13,000 ft., it is quite obvious you couldn't possibly produce those wells. In fact, you would have to have about six times that, or 12,000 bbls per acre to have a bare minimum at 13,000.

Q Is it a sort of popular concept the deeper you

drill these wells, the better wells you are going to get?

A Well, I presume there may be people that have that concept. I don't believe anyone that is familiar with the facts has that feeling.

Q That is not true?

A There is no fundamental reason why an horizon at a deep depth should be any better or different than one at a shallower depth. It hasn't proven to be the fact. Some of the deepest are very thin and not good in permeability or porosity, and don't produce much per acre. There are some good formations, fortunately.

If you had 20 ft. of pay that gave satisfactory production at 5,000 ft., you would have to have over 100 ft. of pay at 13,000 ft., the other factors being identical.

Q To enjoy the same economic position?

A To enjoy the same return, that's right.

Q You are familiar with the proposal here, Mr. Beall, that a temporary rule be passed by the Commission establishing temporary 80-acre proration units, are you not?

A Yes, sir.

Q And in the light of the economic studies that you have made, and in the light of the particular economic factors that are in play here in New Mexico, would you recommend to the Commission the adoption of such temporary rules?

A Yes, sir, I think, as a temporary rule, I don't

see how there could be any real objection against it. As I pointed out, certainly everyone would have to admit you have to analyze the deeper, more expensive drilling a little differently than the shallower and less expensive drilling. The important thing is that nobody knows how the spacing ought to be when the first well is drilled. You can't tell whether the first well is on top of the structure, and has a maximum of everything, or whether it happened to be an edge well, and has more or less a minimum of everything.

And it seems entirely logical and fair to everybody concerned to have a sort of moratorium period during which you find out the facts which have to be found out in order to intelligently determine what the real permanent spacing ought to be. It is important during that period to have -- in which you are getting these facts -- there shouldn't be any steps taken which will cause the permanent spacing pattern to have to be spaced differently than it ought to be. In other words, if you have close spacing to start with, then you either are faced with numerous exceptions -- and those exceptions are hard to take care of -- and it may result in having a permanent spacing pattern that isn't economic and won't attract the capital that has to be invested in it. Whereas, if you start out with temporary wider spacing, you can always drop back to closer spacing if conditions warrant after you have determined what the factors are. And if the

horizon and the pool isn't as good as it has to be to have close spacing, then you are in position to have wider spacing, which should be the case on that type of pool.

Q As the man that handles the money, and handles the dollars and cents involved in this problem, would you say that the porposed temporary wider spacing would be advantagious to the State of New Mexico?

A I think it should. If the State of New Mexico is anxious to attract capital to develop its reserves, and to maintain the position which it currently has of having a progressive and well-regulated conservation program. That is a favorable factor, when you go to analyze these various things. And I think it would be a very good step to the state to maintain that position to advocate a temporary order of this nature.

Q Do you see any way that any possible harm -- I am talking about dollars and cents now -- could result to the State of New Mexico and its citizens by the adoption of this so-called temporary order?

A No, sir, I do not.

MR. FOSTER: I believe that is all.

COM. SPURRIER: Does anyone have a question of the witness?

MR. FOSTER: I would like to introduce these seven charts that we have identified here as part of the record.

COM. SPURRIER: Without objection, they will be admitted.

(Off the record)

COM. SPURRIER: If there are no further questions, the witness may be excused.

MR. FOSTER: Excused from the hearing? He wants to get back to Bartlesville.

COM. SPURRIER: That's right.

(Off the record)

COM. SPURRIER: We will recess until one o'clock.

(Noon recess)

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COM. SPURRIER: The meeting will come to order, please. Judge.

MR. FOSTER: I am going to make one more appearance. But Stanolind will take over.

COM. SPURRIER: Mr. Smith.

F. H. CALLAWAY

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. SMITH:

Q Will you state your name, please?

A F. H. Callaway.

Q By whom are you employed, Mr. Callaway?

A Stanolind Oil and Gas Company.

Q How long have you been so employed?

A Six-and-a-half years.

Q What was your educational background prior to employment with Stanolind?

A I received my technical education at the University of Arkansas and the University of Texas; received the degree in petroleum engineering from the University of Texas in 1946.

Q Do you have any other degrees?

A No, I do not.

Q Did you go to work for Stanolind right after you finished your academic training?

A Yes, sir.

Q What position do you occupy with Stanolind?

A I am presently employed as Reservoir Engineering Supervisor by Stanolind in their Tulsa office.

Q How long have you been engaged in reservoir work for Stanolind?

A Approximately six-and-a-half years.

Q Do you belong to any associations or organized groups for study on reservoir behavior or other types of technical background?

A Yes, sir, I am a member of the Petroleum Branch of the American Institute of Mine and Metallurgical Engineers.

Q Aren't you Chairman of some committee that made a study on the question of well spacing?

A I am Chairman of an API study committee, Mid-Continent District, engaged in the well-spacing problem at this time.

Q And have you attended the meetings of these various groups from time to time during membership in the Association?

A Yes, sir, I have.

Q Are you fully familiar with the so-called controversy that exists between the relative merits of wider and more narrow spacing?

A I have done considerable research in the matter.

Q Are you familiar with the transcript of the proceedings in the hearing involving well spacing as Case 407 on April 16, 1953?

A Yes, sir, I am.

Q Do you recall the statement by Mr. Tesch in the record which reads as follows: "It is generally accepted, regardless whether you are talking about 80-acre, 40-acre, or 20-acre, everything else being equal, that the more wells you drill the more oil that will be recovered from the reservoir."

A Yes, sir, I am familiar with that statement.

Q Do you agree that is a correct statement?

A No, I definitely do not. I believe most of the people that have carefully investigated the problem of well spacing and its relation to the amount of oil that can be recovered from a field are of the opposite opinion.

Q Do you personally concur in the concept the more wells drilled the more oil you recover?

A No, I do not.

Q I assume you are familiar with various argument advanced by various proponentsof differing theories?

A Yes, sir, I am.

Q I wonder if you would give us a brief review of the manner in which this controversy over proper spacing -- that is, whether we should have wider spacing or narrower spacing -- developed?

A Well, there has been a whole lot of water under the bridge in well spacing argument, and I certainly do not want to take the time of all you people to go into a lot of detail on the matter.

However, I do think it is well to point out the place where this well spacing originated, and how it has developed. I think it will throw considerable light on the merits of the various positions taken by the people who believe in close spacing as a means of increasing recovery, and the people who do not believe closer spacing is a method of conservation.

The first formal attention to the well-spacing problem was given in a report prepared by Willard W. Cutler of the Bureau of Mines in 1934. He was studying the decline characteristics of producing leases in a number of oil fields throughout the United States for the purpose of attempting

to compare variations in reserves through use of decline curves. It happened at that time it was necessary for the operator to estimate their oil reserves for the purpose of computation of federal income tax. In connection with this study, he observed -- other conditions being equal -- that under similar leases in the same field he observed the wells drilled on wider spacing recovered more oil than wells on close spacing.

On the other hand, he observed the reverse in regard to separate leases. He observed leases drilled on close spacing did recover more oil per acre than leases drilled on wide spacing.

As a result of this work, Mr. Cutler formulated what has come to be known as Cutler's Rule, which I would like to show as Exhibit 1.

Q As I recall, that was the first formal attention given to it, and is probably the basis for the different contentions that have grown up with regard to this recovery of oil.

A It is the starting point of this controversy on well spacing.

Q Do you have a statement of Cutler's Rule?

A Yes, sir, I do. I don't think we need to read it right now. Let's go on.

Q The Rule I think we might mark for identification

as Exhibit 1. And we have various of these smaller types of exhibits which we will offer to the attention of the Commission, which are duplicates of the ones on the board. The Rule is exhibited on the board?

A Yes, sir, and also on the small sheets.

Q Is there any controversy as to the reliability of the recovery data that was observed by Mr. Cutler?

A No, sir, there isn't. I think it is pretty well established in both advocates of close spacing as a means of increasing recovery and those that do not believe in close spacing as a means of increasing recovery. They all agree under the conditions which Mr. Cutler imposed upon his analysis that closely drilled leases will get more oil than widely spaced leases.

Q The conclusion he came to was correct, but the application of the Rule seems to be a difference of opinion?

A That is correct. The difference of opinion between so-called advocates of close spacing and so-called advocates of wide spacing lies in the interpretation of the facts observed by Mr. Cutler, and subsequently confirmed by other investigators.

Q I understand from your statement that two interpretations can be placed on Cutler's Rule, which lead to diametrically opposite opinions?

A Yes, sir, that is correct.

Q What are the different interpretations?

A I think it can be made plain if you very carefully read Cutler's Rule and remember the assumptions he made.

Cutler's Rule states "The ultimate production for wells, of equal size, in the same pool, where there is interference, seems approximately to vary directly as the square roots of the areas drained by the wells."

Mr. Cutler restricted comparison to leases of approximately the same pay thickness and the same initial productivity and wells in the same pool. Under the circumstances in which he had observed that the new wells drilled in the field did interfere with and reduce recovery from old wells already producing. He restricted it to solution gas-drive reservoirs, and, of course, applied it to production under no production restrictions; all wells produced essentially at capacity.

Q Do you have an exhibit that illustrates the proposition that you have just stated?

A Yes. I would like to show Exhibit 2, which is purely for illustrative purposes.

Exhibit No. 2 is a portion of the Healdton Field in Carter County, Oklahoma. This is the type of development with which Cutler was concerned when he developed his Rule.

You notice there is no well development pattern on this map. I have indicated in red the average well spacing in acres per well of the various leases. You notice it varies from as little as 1.67 acres per well on a certain lease up

to 4 or 5 acres per well on another lease.

Now, I would like to propose just for a moment and assume two of these leases in the Healdton Field here were developed on different spacing, but had approximately the same pay thickness and the wells were of the same quality, making the same number of barrels per day. It is established from facts that the lease on closer spacing will get greater recovery per acre. There are only two possible reasons for that.

One reason could be that the closely spaced lease did a better job of extracting the oil from the sand underneath it. That is, it had a higher recovery factor, in engineering terms. A larger portion of the oil in place was recovered. That is one possible explanation for the behavior Cutler observed.

The other possible explanation is that the lease on closer spacing benefited by migration of oil across lease lines from the wider spaced lease to the closely spaced lease. In fact, it is possible the increased recovery for the closely drilled lease might be due to the migration of oil across lease lines.

In that case, the widely spaced lease would have subnormal recovery because it would lose by migration of oil.

Q Do you have any specific illustration on Exhibit 2 to show how that operates, Mr. Callaway?

A Well, for instance here are two 30-acre leases.

N, here is a 30-acre lease, an offset to that lease which was drilled to 4.29 acres per well.

Q You mean that the closely spaced tract could have gotten more oil either by doing a better job of drilling the sands under the lease or by capturing oil from a neighboring lease on a wider spacing basis?

A Yes, sir. I could have been either reason, but there is no way to tell from the physical data itself.

Q Just how do these result in different conclusions regarding well spacing?

A Let's assume for a moment, as Cutler did, that no oil migrated across lease lines. That would mean that the closer spaced lease got greater recovery by virtue of doing a better job of extracting oil from the sand. You could then go in and drill other leases in the field to closer spacing and thereby increase their recovery, thereby increasing recovery in the field as a whole by drilling additional wells.

On the other hand, if the additional recovery had been due to migration across lease lines, the drilling of additional wells on wider spaced leases would simply re-allocate the available oil between leases and not result in increased recovery from the field as a whole.

The people that advocate close spacing have adopted the first attitude and those differing have adopted the second.

Q What is your opinion in this matter?

A In my opinion, the additional oil recovered by the closely spaced wells -- leases -- under the conditions which Cutler observed was due primarily to the migration of oil across lease lines.

Q Do you have any support for this opinion?

A Yes. I think that the conditions which Cutler assumed, and which other advocates of close spacing have similarly assumed in obtaining their factual data were such as to be ideal for the migration of oil. Remember Cutler restricted the Rule to the same field where there was an opportunity for migration to occur, and restricted it to cases where he had actually observed leases interfering with each other and were competing for a common source of supply of oil.

Q In other words, his observations have indicated to you definitely his Rule had no application unless there was a reduction in the productivity of the old wells as a result of drilling new additional wells?

A In my opinion, it appears inevitable under the circumstances which were used for developing data of this type that migration to the closely drilled tract at the expense of the widely spaced tract is inevitable.

Q You mean other factors being equal, the closely spaced tract is bound to benefit from that migration?

A That is correct. It would be true under any

circumstances unless you had an allowable, and restricted production per acre the same regardless of spacing.

Q Are there any physical facts to support the conclusion that such migration is inevitable?

A I would like to turn now to Exhibit 3. This is an hypothetical case involving two adjacent leases in the same field, which have been drilled to different well spacing, but on which we may assume for the moment the characteristics of the sand and the productivity of the wells are equal.

Now, assume 16 wells are drilled on Lease No. A, which gives a 2½ acre spacing. And only 8 wells drilled on Lease No. B, to give a five acre spacing. And put those two leases on production. If the productive capacity of the wells average 100 bbls per day, we can say Lease A will produce 1,600 bbls per day, and Lease B only produce 800 bbls per day. What that means is that the pressure on Lease A will decline more rapidly than the pressure on Lease B. Which after a short time will result in a situation in which Lease A will be at a lower pressure than Lease B. This must result inevitably in the migration of oil from Lease B to Lease A.

Q In your opinion, what is the significance of this migration insofar as it may have application to the so-called well spacing controversy?

A Well, what it means is that these combinations of leases of different spacing in the same field are of no real

value in tieing down this well spacing question.

You have two unknowns: the possible effect of spacing on the extraction efficiency of the oil, and the migration. There is no way to isolate these two factors to determine how much of the effect is due to which, from the various data which have been used.

Q It is your opinion that the comparable recovery from different leases in the same field is of little value either way in evaluating the effect of well density on the recovery that may be expected from two respective leases?

A Yes, sir, that is correct, it is for all practical purposes; it is useless.

Q Well, is this the type of data that is still being advanced largely in support of the proponents of more close spacing?

A Unfortunately it is. Most of the factual information which advocates of close spacing as a means of conservation have used and are still using today are examples of this type.

Q Then it does appear that a substantial part of the increased recovery may be attributed to this migration? You stated earlier, in your opinion, most of the increased oil from the densely drilled tract was migratory oil, is that right?

A Yes, sir, that is my opinion. I have undertaken

to calculate what the magnitude of migration would be in a field of this type, in which you had unequal well spacing, to see if it would be of sufficient magnitude to have caused the behavior which Cutler observed.

Q Have you any of the results of your calculations available by way of exhibit?

A Yes, sir, I do. I have several. I don't want to explain each one separately because of the time, but I would like to show Exhibits 4 to 10 at this time.

Q Suppose, Mr. Callaway, that you step over to the board here, and we will flip these through and you might give your explanation at that time.

A All right. I have brought here -- this is from theoretical calculations, now -- the calculated recovery per acre in thousands of barrels.

MR. FOSTER: I don't believe the Commission can see that chart.

MR. SMITH: They have a copy before them.

MR. FOSTER: I know, but they are interested in following him.

(Off the record)

A Plotted on the vertical scale is the recovery per acre in thousands of barrels per acre. Plotted against one divided by the square root of the acres per well on the lease concerned. I plotted this thing this way so that Cutler's

Rule could be plotted as a straight line, which is a dash line on this curve.

Assuming we had a segment of a reservoir, as outlined here, and the center lease had 4 wells, and the eight surrounding tracts had one well, and those wells were of equal productivity, and were operned up for capacity production at the same time. We would find that the recovery per acre from the tracts drilled on wide spacing would be approximately 3,200 bbls per acre. On the closely drilled tract in the center the recovery per acre calculates about 9,700 bbls per acre.

Now, you notice that the lines connecting these two points is actually steeper in slope than under Cutler's Rule. Which means under these circumstances the degree of the migration would cause a larger degree of recovery.

This next exhibit, which I believe is Exhibit 5, is a similar type of data except we had two wells drilled on the center tract instead of one. Once again the variation in recovery with spacing due to migration alone is greater than that observed by Cutler.

The same thing is shown by these other exhibits, which I won't comment on except to show them to you. They have a little different geometrical configuration in each case, but the plot gives the same type of results in each instance.

Q These all show support for the proposition that

the migration of oil would account for the phenomenon observed by Cutler upon which he based his proposition you get more oil per acre.

A Yes, sir, that is correct.

The results of these calculations are summarized on the next exhibit. I don't have a large chart for this, unfortunately. But I do have a small sheet you can have; Exhibit No. 10. It summarizes the results shown on the six charts which I have just gone over.

You notice on the next to the last line is the recovery ration of closely spaced leases next to wider spaced leases as actually calculated due to migration.

The last line represents the recovery ratio which Cutler would have predicted by his rule.

In each case the difference in recovery between the wider and closer spaced leases as calculated due to migration was as great or greater than that observed by Cutler.

Q Now assuming that these recovery comparisons of different leases in the same field are of little use in tieing down the density problem, what can be done to evaluate the effect of well spacing on recovery.

A Well, the ideal way, of course, would be to take an oil field, drill it up, and produce it on one spacing, and then, by some magic, restore it to initial conditions, and drill on another spacing and produce it again, and see

how much you get in recovery. Of course, it is impossible to do this. If we could find two fields which were essentially identical in all other respects, but which had been developed on different spacing, and depleted those fields and compared their recoveries, we would have a sound and valid answer to the effect of well spacing on recovery. That would be true, of course, because oil could not migrate between separate fields. It is a tough job, however, to find two oil fields which are identical, but which have been drilled on two different spacings. And I personally know of no conclusive examples of this type which have been developed so far.

There has been some rather thorough work done from a statistical standpoint by an API committee. In this API study the recovery factor for a large number of fields was correlated with their well spacing to see if any general trend existed in favor of the closely drilled fields.

The work of this Committee was reported in a technical paper which was printed in the API Drilling and Production Practices for 1945. It was entitled "A Factual Analysis of the Effect of Well Spacing on Oil Recovery", and was authored by R. C. Craze and S. E. Buckley. This work reflected no apparent variation in the recovery efficiency with well spacing. That is, there was no variation observed which was of sufficient magnitude to be noted in the statistical work done by this Committee.

The analysis which this Committee did in regard to water drive fields was particularly convincing since a very large number of fields were used for making the study.

Q Now, is there an exhibit that reflects the findings of that Committee?

A Yes, we have Exhibit No. 11.

Q Which is the one now exhibited on the board?

A Yes, sir, that is the one now exhibited on the board. Plotted on the vertical scale is the estimated oil which will remain in the rock after a field is depleted. On the horizontal scale is the average well spacing for the field involved. You will note there is no apparent trend which would indicate that the closely spaced fields did a better job of getting the oil.

Q Have other authors or students of this subject gone into the matter from any different standpoint?

A Yes, there has been a considerable of effort expended in attempting to evaluate the effect of spacing on recovery from theoretical considerations. This matter has been investigated by Barlow and Berwald, and reported in the API Drilling and Production Practices for 1945; by Loper and Calhoun, as reported at the 1948 meeting of the Petroleum Branch, AIME; by Miller, Browscombe and Kieschnick, which was published in the AIME Transactions for 1950 -- for 1949; by Dr. S. J. Pierson in his textbook "Elements of Oil Reservoir Engineering";

and by Keller and Callaway, as reported in the AIME Transactions for 1950.

Q You are the Callaway that is the author of that particular paper, is that right?

A Yes, sir, that is correct.

Q Now, all of this work was confined to depletion type reservoirs, wasn't it?

A Yes, sir, that is correct.

Q What was the reason for that?

A The reason that the theoretical work has been confined to the depletion drive reservoir is the fact that it is obvious from the physical factors at work that the answer on a water drive field would be no variation in recovery with well spacing.

Q Quite a bit of work on that has been done by Mr. Buckley, hasn't it?

A Yes, sir, there has.

Q I believe he is here today.

A Yes, sir, he is.

Q What were the results of these various depletion type reservoir studies?

A All these calculations -- which, incidentally, are each approached from a little bit different angle -- they all resulted in the conclusion that the recovery of oil should not be appreciably influenced by well spacing. The calculations

show a very slightly larger recovery of oil on closer spacing. However, the increase is so small as to be of no real practical significance.

Q I understand you were one of the engineers to investigate this matter. Are you in a position to show some of the results of the work?

A I will be glad to do that. The technical basis for the calculations themselves is extremely complex, and I certainly don't want to bother you with that at this time. I would like to show you the results of some of these calculations, and attempt to explain in quantative terms the reasons we get the answers we do.

With the depletion type oil field, the oil is driven from the pores of the rock and replaced by gas, which is released from solution. This causes the pressure to decline and more gas is released from the oil until the pressure falls to a low value, and the wells will no longer produce at commercial rates. The oil production is directly related to pressure decline, and the lower the abandonment is -- at the time the wells are abandoned -- the higher will be the recovery factor, other factors being equal. But the depletion drive mechanism for -- recovery is usually only a small fraction of the oil in the rock by this method, usually on the order of 10 to 30 per cent. At the time the wells must be abandoned, the pressure throughout the reservoir is generally low. However, it will be slightly lower near the well bores than it

will be out in the area between the wells. This means that the recovery will be slightly better near the wells than it will be out in the central area, and that is the reason for the slight increase in recovery with close spacing.

Q Do you have an exhibit which represents this pressure and oil saturation when a field is abandoned?

A Yes, sir, I have two or three exhibits which will show how that works.

Exhibit 12 shows the calculated distribution of pressure and unrecovered oil at the time the field is abandoned as a function of the distance from the well bore. You can see that the pressure is somewhat lower close to the well than out 6 or 7 hundred feet away; and also the unrecovered oil is slightly lower near the well bore than at a distance.

Q Do you have a sketch to portray the alteration in underground conditions which results from the drilling of an extra well between two producers; that is, an infill well?

A Yes, sir, I have such an exhibit; Exhibit 13.

Q Will you explain this exhibit, please?

A This exhibit is simply a diagrammatic sketch to show you where extra oil comes from when you drill on closer spacing. Assume that the field were drilled and depleted with only wells on the extreme left and right. The remaining oil underground at the time the field must be abandoned is represented by the solid curve. If an additional well had been

drilled between the wells on 80-acre spacing, as indicated by the dotted well in the center, the conditions in the reservoir at the time the wells must be abandoned would be represented by the dotted curve, which falls slightly below the other curve in the center. The hachured area represents the additional oil which would be recovered by the infill well, which could not have been recovered by the wells spaced on 80 acres.

Q Do you have an additional exhibit reflecting the comparison of recoveries to be expected if a denser drilling is followed?

A Yes, sir. If you convert the type of curve which I have just shown you to its significance in terms of recovery, you have the results shown on the next Exhibit No. 14. On the vertical scale is plotted the recovery efficiency, per cent of oil in place. On the horizontal scale, the well spacing.

I would like to point out on these exhibits that they are peculiar to only one particular set of reservoir conditions. If you worked the same calculations on a different field, you would get answers of a different magnitude, but still have the same relative relation between close and wide spacing.

You note from Exhibit 14 that the recovery factor would figure out in this field at 16.45 per cent on 40-acre spacing; about 16.3 per cent on 80-acre spacing. Assuming this figure

would make 5,000 bbls per acre on 40 acre spacing, the recovery on 80-acre spacing would be 4,950 bbls per acre. The additional oil recovered by the second well on an acre -- an 80 acre tract would be about 4,000 bbls.

Q Now, do you have an additional exhibit reflecting the calculations for the Fowler Field in New Mexico?

A Yes, sir. Exhibit 15 is a bar graph which shows results of similar calculations on the Fowler Field in New Mexico. I think this chart has previously been placed before the Commission in a hearing on Fowler.

Q These also were theoretical calculations?

A Yes, sir.

Q Now, just what assumptions were made? How do these assumptions affect the reasonableness of the answers you have obtained?

A It is necessary to make assumptions in any calculations on reservoir behavior and mechanics. The only critical assumption it is necessary to make is that the reservoir is continuous throughout. One continuous and common source of supply of fluids and drainage through all parts of the reservoir to the wells which have been drilled.

Q What about the existence of lenticularity in the producing zone.

A It is obvious if you have isolated segments of the reservoir due to lenses or faulting conditions which are not

in communication and cannot be drained by the wells on the existing spacing pattern, that closer spacing then would tap these previously untouched zones and increase recovery of oil. However, the amount of increased oil which you would get would depend on the number and size of the lenses which you would happen to tap.

Q That is a condition which could be detected as a field is developed?

A Yes, sir, that is correct. In my opinion, the effect of well spacing on recovery would be very small unless this type of condition exists. It is possible by means of cores and the proper type of engineering and geologic data during the process of developing a field to obtain fairly conclusive evidence as to the presence or absence of lenticularity conditions in the reservoir.

Q In studying a reservoir as the field is developed, it is possible to determine whether or not there is freedom of communication throughout a given oil pool?

A Yes, that is correct. I think the Commission probably is familiar with engineering information of this type from previous hearings. I would like to show a few examples of the type of data which can be obtained to determine whether or not we have communication throughout a reservoir.

Q These are some results of physical studies?

A These are results of physical studies.

Q They support theoretical assumptions made in your earlier testimony?

A Yes, sir.

Q Do you have one -- an exhibit showing the results of physical tests in the Fowler Field?

A Yes, sir. Exhibit 16.

Q All right. Will you please explain this exhibit?

A This exhibits reflects the pressure behavior of a well in the Fowler Field which was shutin for a period of approximately 500 days while other wells in the field were being produced. You will note that the pressure on the shut-in well declined continuously during the period in which it wasn't being produced. This means that the oil underneath the shutin well was being drained upon by the offset wells. The nearest one of which was about 1,867 ft., a diagonal 80-acre location.

Q During this period of time that the well was shutin additional wells were being drilled in the field?

A That is correct.

Q And what was the observation with regard to the bottomhole pressures of these additional wells being drilled, as compared with the pressure in the key well?

A The pressure on all wells, including the new wells and the shutin well and the wells being produced, went right along together; declined at the same rate.

Q Now, do you have a similar exhibit for the Anton-Irish Field?

A Yes, sir. Exhibit 17 is the results of a similar interference test on the Anton-Irish Field. Just another example of the type data you can get. I don't think it needs any further comment.

Q Those dots indicate the points in time when various tests were taken?

A Each dot represents a separate pressure determination on that well.

Q Do you have an exhibit for the Goldsmith Field?

A Yes, sir. Exhibit 18.

Q Goldsmith is the next one.

A Did you say Slaughter?

Q I said Slaughter, I meant Goldsmith.

A Yes, sir.

Q Will you explain the significance of the curve reflected upon the exhibit for the Goldsmith Field?

A The solid curve represents the field average pressure in the Slaughter Field for the period 1935 --

Q Goldsmith Field, you mean?

A Goldsmith, excuse me.

Q I got you off on the wrong track to start with here.

A From 1935 to 1946. The circles represent the pressures upon completion of infill wells or field extensions

drilled subsequently.

You will note the pressure on all of the wells drilled at a later date was substantially below the initial pressure, and the same order of magnitude as the field average pressure; which means that the undrilled locations had been draining prior to the time those additional wells were drilled.

Q Do you have an exhibit reflecting the gas-oil ratios of the infill wells drilled in the Slaughter Field as compared with the wells that had been drilled earlier?

A Yes, sir, I have Exhibit 19 for pressure data on the Slaughter Field rather than gas-oil ratios.

This represents a portion of the Slaughter Field in Texas. The circled wells are infill wells which were drilled in 1948. The un-circled wells are wells which were drilled in 1941. Above each of them is tabulated the pressure on that well during 1948.

You will note that the initial pressure in this reservoir was 1771 lbs. The average pressure of the old wells in 1948 was 1,332 lbs. The average pressure upon completion of the new wells in 1948 was 1,313 lbs. This shows that the reservoir tapped by the new wells was being depleted by the old wells at the same rate as the locations immediately around those old wells.

Exhibit 20 is a comparison of gas-oil ratio data on the same field, the Slaughter Field. Here again, the gas-oil

ratios of the old wells drilled in 1941 are compared to the gas-oil ratios of the new wells at the time they were completed. The solution gas-oil ratio in the Slaughter Field was 470 cubic feet per barrel. And that was approximately the initial producing ratio of the wells drilled in 1941. In 1948 the average ratio of the new wells upon completion was 1,228 cu. ft. per barrel. The average gas-oil ratio of the old wells at the same time was 1,229 cu. ft. per barrel.

Since the pressure and the gas-oil ratios are both related to the amount of oil which has been produced from the locations in a depletion-type reservoir, this data shows that the entire area was being drained uniformly by the original wells on the wider spacing.

Q I assume you have chosen certain fields by way of illustration, and I assume you know also of many other fields where the same facts have been developed to support the theoretical assumptions you have testified to earlier?

A Yes, sir. That is correct. I have had access through my own company, and other sources too, to a large amount of data of the type just shown. My observation has been that almost always the data indicate good communication throughout most of our oil fields. The assumptions which I have put on today are simply to illustrate the type of data which can be gathered to prove this point.

Q The information you have cited up to now has applied

to gas-drive fields. What can be done to establish continuity of communication in water-drive fields?

A Well, the establishment of communication in water-drive fields is no problem at all. If you have a water drive, you automatically know you have communication. In a water drive most of the oil produced is replaced by edge water encroachment, which means oil must migrate over long distances throughout the reservoir. So, if you observe the field has water drive from performance characteristics, you know it is -- you know there is sufficient communication.

Q Mr. Callaway, in view of the testimony you have given and your research as indicated by your testimony, I would like to have you say whether or not you consider yourself to be an advocate of wide spacing?

A No, I am not necessarily an advocate of wide spacing. The question of proper well spacing is one which depends upon the circumstances peculiar to the individual field at hand. In the absence of lenticular conditions, which in my experience is the exception rather than the rule, the problem is one of economics and the protection of correlative rights. Certainly a reasonable number of wells must be drilled in every oil field. Enough wells must be drilled to allow the field to be developed and depleted at a reasonable rate, to obtain adequate sub-surface information to determine the proper production methods, and to evaulate the field, and to

protect the correlative rights of the various property owners in the field. I do not believe in general fields should be drilled on close spacing for the purpose of getting greater oil recovery or in the expectation of getting greater oil recovery.

Q Do you have any general opinions as to the proper approach to the well density problem in oil fields?

A Well, it appears to me it is simply good business to drill a field at first on fairly wide spacing insofar as is compatible with ownership and other practical considerations; to obtain some idea as to the extent and quality of the field and accumulate engineering information which will evaluate the need for additional drilling. Infill wells can then be drilled as necessary or desirable.

MR. SMITH: At this time I should like to offer in evidence all the exhibits that have been previously identified by Mr. Callaway.

COM. SPURRIER: Without objection, they will be admitted.

MR. SMITH: I have no further questions of this witness.

COM. SPURRIER: Does anyone have a question of the witness? If not, the witness may be excused.

(Witness excused.)

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MR. MADOLE: If the Commission please, we offer this -- Ross Madole, on behalf of the Magnolia Petroleum Company -- we offer this witness in rebuttal to the impression that was given by Mr. Tesch in his testimony that the Bureau of Mines study of the Healdton Field was an illustration of his theory of more well, more oil. And we wish to introduce evidence to rebut that impression.

BYRON O. SIMMS, JR.

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. MADOLE:

Q Mr. Simms, state your full name, please.

A Byron O. Simms, Jr.

Q By whom are you employed?

A Magnolia Petroleum Company

Q What professional degree do you hold?

A I have the BS degree in petroleum engineering from the University of Texas.

Q In what year were you graduated?

A 1949.

Q Since that time have you been employed as a petroleum engineer?

A That is correct. By Magnolia.

Q At this time you are located in the Healdton Field?

A That is true.

Q How long have you been in that location?

A I have been at Healdton three years, now.

Q Since you graduated you have been in the employment of Magnolia?

A Yes, sir, that is correct.

Q You had occasion to make a study of the Healdton Field?

A That is true.

Q Have you previously qualified as a witness in New Mexico before the Oil Conservation Commission?

A No, I haven't.

MR. MADOLE: Do you think any further qualifications are needed?

(No audible response from the Commission.)

Q Will you state the occasion of the study made by the Bureau of Mines in the Healdton field in Carter County, Oklahoma?

A The Bureau of Mines made a study of the Healdton Field, and it was a petroleum engineering study of the field to determine and evaluate the potentialities of water flooding of the field.

Q In other words, the primary function of the study was as to whether or not it lent itself to secondary recovery by water flooding?

A That is correct.

Q Will you turn to page 44 of this report, and give the Commission the results of that study?

A The result of their -- they investigated infill drilling a littlebit. This is aside from the water flooding part. The conclusions they reach, and I will read from the report.

"Twenty million barrels of oil over and above that expected by normal production methods was produced as the result of additional drilling, deepening, clean outs, vacuum applications, and gas injection."

And a little farther down they say, "Also 440 new wells have been drilled in the Healdton oil field during the last 25 years. It is interesting to note that at no time since 1920 has the number of producing wells equaled the number of wells" -- 1,971 wells -- "producing at that time; the number of wells abandoned exceeded the number of new wells completed; and in 1950 the number of producing wells was 95 less than in 1920."

I might add here this 20,000,000 bbls which was accumulated from all these factors, such as additional drilling, deepening, vacuum application, and other methods, amounts to a little less than ten per cent of the total recovery from that field to date. And of this other ten per cent, your infill drilling is an insignificant portion of that.

MR. MADOLE: We offer in the evidence the full

report of the petroleum study committee of the Bureau of Mines on the Healdton Field.

We have no further questions.

COM. SPURRIER: Are there any questions of the witness? If not, the witness may be excused.

(Witness excused)

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MR. MADOLE: Will the exhibit be received?

COM. SPURRIER: The exhibit, without objection, will be received.

(Recess)

E. N. WASHBURN

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. FOSTER:

Q State your name to the Commission, please.

A E. N. Washburn.

Q You are employed by Phillips Petroleum Company?

A Yes, sir.

Q As an engineer?

A Yes, sir.

Q You have testified before the Commission here before and stated your qualifications, have you not?

A Yes, sir.

MR. FOSTER: Are they accepted?

COM. SPURRIER: Yes, sir.

Q Mr. Washburn, at a former hearing of this matter, which is now under consideration, testimony was placed in the record to the effect that the matter of the spacing of wells in newly discovered fields should be left to the agreement of the operators in the field. And at that time one member of the Commission here asked the question as to how the pattern of 80 acres got started in those fields. Have you made an investigation for the purpose of determining how that happened?

A Yes, sir.

Q Will you just tell the Commission how it happened.

A There are four fields considered as having 80-acre spacing now: the Fowler Field, which started from a federal unit; the Knowles Pool, and the Hightower, and Crossroads. The latter three fields, one operator owns the larger part of the field, and for that reason it was easier or simpler to get approval from the Commission for 80-acre spacing.

Q But the 80-acre pattern was set before the operators came in and asked for the establishment of the 80-acre pattern?

A That's right.

Q But that pattern was set because the operators in those fields where they drilled the discovery well controlled

most of the acreage?

A Yes, sir.

Q In two of them, I believe, one operator controlled all the acreage?

A That is my understanding.

Q What operator was it and what field?

A Amerada in the Knowles and Hightower, I understand.

Q In what field was all the land federally owned?

A That was Fowler.

Q And who owned the majority of the acreage in that field?

A I am not familiar with that.

Q You don't know?

A No, sir.

Q Now, at the former hearing of this case there was testimony placed in the record here to the effect that the Commission should deny the establishment of this temporary 80-acre order for the reason that 80 acres was too much of a step out, and that it would result in the drilling of more dry holes if you went to 80 acres than it would if you stayed on the 40-acre pattern. That was expressed as an opinion, I believe, without any facts given to support it. Now, I will ask you if you made any investigation of the fields in this state that are drilled to a depth below 10,000 ft?

A With respect to 80-acre spacing?

Q Yes, sir.

Q Yes, sir, we did.

Q How many fields in this state are producing below 10,000 ft?

A We found 19 fields.

Q Nineteen fields. And did you make an examination of each of those 19 fields to determine whether or not there would have been any more dry holes drilled in those 19 fields if they had been drilled on 80-acre spacing than there would have drilling them on 40-acre spacing?

A Yes, sir.

Q What did you find out?

A We found in 18 of the 19 fields 80-acre spacing would not have contributed to more dry holes than regular 40-acre spacing. The one exception was the Hightower Field where we found four dry holes, and it was drilled on 80 acres. But you can't be definitely sure if it had been on 40 it might not have had dry holes, too.

Q Might havehad the same dry holes on 40 if -- as they had on 80?

A That's right.

Q Is that correct?

A Yes, sir.

MR. FOSTER: That is all.

COM. SPURRIER: Anyone have a question of the witness? If not, the witness may be excused.

(Witness excused)

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MR. SHAVER: Charlie Shaver, representing Humble Oil and Refining Company.

At this time we would like to call Mr. S. E. Buckley. He was referred to in the April 16th hearing by Mr. Tesch and J. K. Smith, and we would like to present some testimony.

S. E. BUCKLEY

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. SHAVER:

Q Will you please state your name, and in what capacity you are employed?

A My name is Stuart E. Buckley. I am employed as head of the Production Research Division of Humble Oil and Refining Company.

Q Mr. Buckley, will you state briefly your formal educational qualifications?

A I graduated from the University of Texas in 1932 with a BS and MS degree in chemical engineering.

Q Mr. Buckley, for the benefit of the Commission since you haven't testified here before -- that is correct, isn't it?

A That is correct, I have never testified here.

Q Would you summarize for the Commission what activities you have participated in for the past 19 years, in a general way, to inform yourself as to the efficient recovery of oil and gas and related matters?

A The past 19 years has been in the Production Research Division of Humble Oil and Refining Company; for a number of years as research engineer; for the past 11 years as head of that division.

One of the main objectives of that research is to study different methods by which we may increase the efficiency of underground recovery. That is our chief objective. Studies of that sort have included, naturally, a study of the effect of well spacing on recovery as well as all other factors that influence recovery. That research has been the main objective of the Research Division ever since I have been in it.

My work in that capacity has included study not only of the fields in which Humble operates, but I have had access at the same time to data from many other oil fields throughout the world.

Q Mr. Buckley, would you please state what your understanding of the problem before the Commission in this Case 407 is?

A My understanding, Mr. Shaver, is that there are really two issues before the Commission. One is a proposed

rule which would permit temporary employment of 80-acre spacing during the development of a new pool. The principal purpose of allowing it is to determine the proper geologic and engineering data on which to arrive at a sound spacing for each individual pool, after a hearing is held for that purpose.

I understand that the Commission is concerned with a second question; the question of well spacing in general, and its effects on ultimate recovery. The second, not insofar as it bears directly on the first, but being obviously a related topic.

Q Now, Mr. Buckley, would you please state your views on the proposed rule? You have studied this rule, haven't you?

A I have, sir. I have for many years subscribed to the view that the proper development of new pools would entail the employment of the widest feasible spacing during the early development for the purpose of permitting the operators to determine the nature of the structure and the underground geology and the other factors that would influence the ultimate recovery, with the further objective of permitting a determination of what type recovery mechanism is most apt to be operative. Such a procedure would permit, early in the life of a pool, a proper determination of the method that would be most effective in bringing about the recovery,

and at the same time the spacing and location of wells that in relation to the type recovery would best suit the purpose. It would, therefore, seem perfectly logical to employ wide spacing during the early development to permit this determination early, with a minimum expenditure; and in the light of those facts to set the proper spacing for the pool after the facts are known.

Q You would say, in your opinion, the adoption of this rule would be a forward step in conservation?

A I think it would not only be technically forward from an engineering standpoint, but very definitely serve the public interest from the standpoint of conservation.

Q You mentioned a second question awhile ago. What have you found out on the question of the relationship, if any, between well spacing and ultimate recovery?

A The question of well spacing and its effect on ultimate recovery, as you have probably gathered from the earlier testimony, is quite technically involved. I think it would be impossible to do complete justice to it in a very short time.

What I would attempt to do, if it meets your pleasure, is give a brief digest of what the essence amounts to. I might state first the fundamental facts generally recognized, and so far as I know not controverted, which underlie the basic principles of the recovery of oil. And I think we

might then be able to see the effect of well spacing in its more proper light.

In the first place, oil is inherently incapable of expelling itself from the pores of rock. It has to be ejected by a displacement agent like gas or water, and it has to b e acted on by an explodable force. The only forces are pressure and gravity. It is in combination by displacement by gas and water and the proper use of these forces we are able to recover -- influence recovery -- of oil either efficiently or inefficiently.

Secondly, the effectiveness of theseagents differ; gas, in general, being less effective than water.

Thirdly, the efficiency of recovery requires we use these displacements in the most effective possible manner. That is, if displacing with gas, we want to control the displacement throughout the entire extent of the pool in such fashion as to maximize it. If using water, the same thing is true in principle, but the mechanics are somewhat different because of the difference in behavior of gas and water.

So far as I know these basic facts are not controverted. They are generally and universally recognized as underlying the behavior of oil and gas reservoirs by all that have studied that subject.

In logical sequence, when we recognize these facts, the questions of wells comes next. The wells really serve two main pruposes:

First, they are the focal points through which oil escapes from the reservoir, and

Second, provide the observation points through which are obtained the geologic and engineering data which permit us to determine the nature of a reservoir and how to develop it.

During the development of a new pool it is the observations we are able to make through a well that are, in my opinion, at that time the more important.

Based on my research and that of my associates and others whose work I have studied who have also studied the behavior of oil and gas fields, when we take into account the various characteristics we see the recovery depends on a number of factors.

On the one hand are the inherent characteristics, geology and structure and character of formation and character of the contained fluids. Those, in general, are beyond the control of the operator.

In the second place, there are those factors the operator can control. For example, avoidance of the waste of gas, and the control of the rate of production, and to a substantial extent, control of fluid movements; that is, of water through a reservoir.

Now, when trying to get the utmost in recovery from a reservoir, it is obviously through control of these controllable factors we can bring that effect about. When we properly con-

trol these factors -- those are the things that are important, rather than the mere number of wells we happen to have drilled into the reservoir. The wells exert an influence only insofar as they can effect the efficiency of the displacement process; that is, if they can be used to control movements of gas and water through a reservoir. Because it is those movements and displacements that go with them that in the long run determine that the ultimate recovery will be high or low.

Q Now, Mr. Buckley, what you have said here on this question of well spacing has been rather technical. Could you kind of summarize what you have said in less technical terms for the Commission?

A I think so. In effect, I think the whole question might be summarized as follows: In any reservoir we must drill a minimum number of wells, core them, log them or otherwise test them to determine (a) the extent of a reservoir and (b) its characteristics, and all the properties of the oil and gas.

The second point: an adequate number of wells must be located in the proper structural positions to provide for thorough flushing by water or by gas. Now, we should recognize that the structural positions are different for different type reservoirs. If it be a water-drive reservoir, proper structural location of wells, in general, would be

different from that of a reservoir in which the primary displacement agent would be gas.

The third point: the total number of wells and proper structural locations obviously must be adequate to permit the desired total rate of withdrawal from the reservoir without cuasing local unfavorable conditions through excessive rates of production from an individual well.

Now, those are requirements. How many wells do we need as a minimum to properly determine information on the reservoir, to properly develop it, and to set the ground work through which we can efficiently recover the oil. After we have met these requirements, the mere drilling of additional wells would, in my opinion, serve no useful purpose. It would have no material effect on ultimate recovery, and obviously constitute economic waste.

Q Mr. Buckley, you have made these statements, now. Can you advise the Commission as to whether or not other technical people share your views on well spacing?

A I have stated these as my personal convictions, but I am quite convinced these opinions are concurred in by an overwhelming majority of those who have made technical studies of the recovery of oil.

Q Who are some of these people?

A For example, The Special Study Committee on Well Spacing and Allocation of Production of the American Petroleum Institute. That Committee was active in its studies from 1933

until 1950. They have published various reports I would like to refer to in a moment.

Other groups that have studied this question and whose views, in general, I think substantiate my own are the Engineering Committee of the Interstate Oil Compact Commission. One such Committee made a report in 1941. Another report was issued in booklet form in the year 1951.

I think the views are also fully supported by a more recent report of the Research and Coordinating Committee of the Interstate Oil Compact Commission.

In substance, I don't think there is any real disagreement on the technical points in the great majority of those that have studied the question in the last 10 to 15 years.

Q You referred to several committees and reports there. Let's go back a little bit and tell the Commission what is this API report of 1941 you referred to a moment ago.

A The API had for many years a Special Study Committee on Well Spacing and Allocation of Production. Since well spacing was obviously related to allocation, the Committee studied all aspects of well spacing and allocation and the protection of correlative rights, and the effects of well spacing on ultimate recovery. Their views were summarized in a progress report published in '42 entitled "Standards of Allocation of Oil Production Within Pools and Among Pools."

I think this Committee recognized, as I do, the various factors that do influence recovery of oil, including the proper structural location of wells. If I may quote from that report on page 27, and I quote,

" ..... careful studies of the theoretical and practical aspects of well spacing indicate that, under the efficient operating methods made possible by (among other things) restricted production rates, ultimate recovery is in many cases substantially independent of the number of wells."

Q Now, Mr. Buckley, you have also referred to a report of the Engineering Committee of the Interstate Oil Compact Commission of 1941. Would you tell the Commission what that report is?

A That was a report submitted by the Engineering Committee of the Compact Commission at its meeting in New Orleans, La. in April, April 14, 1941. That was a brief report containing, in effect, a number of conclusions arrived at after a study of those factors that influence the ultimate recovery of oil, including the effects of well spacing. That report was issued as a part of the booklet containing the report mentioned before of the API Special Study Committee on Well Spacing. If I may quote from that report to illustrate the views of the Engineering Committee of the Compact Commission their Conclusion No. 21, which reads as follows,

"Well spacing is a controversial matter but the trend

of best considered thought seems to be that from a strictly physical viewpoint, recovery does not depend materially upon well density and that the problem is largely one of economics. This is the belief of your committee and it approves of the tendencies toward increasingly wider spacing which are being shown by the various state regulatory bodies."

That is particularly pertinent to the proposed rule before the Commission.

Their Conclusion No. 22. Remember these are conclusions arrived at in 1941. I quote:

"Your Committee urges that the various regulatory bodies prevent the development of new pools on a pattern of close spacing. Once pools have been drilled with close spacing, the capital invested in unnecessary wells and the limitation of minimum per well allowables established in some states exerts an unfavorable pressure upon the mechanics of proration and in many cases forces field production to a higher rate than should be permitted under good conservation practice."

Q Now, Mr. Buckley, has the API Well Spacing Committee you refer to compiled any recent information since 1941?

A The Well Spacing Committee has continued to be active, as I mentioned before, up until 1950. During the '40's, recognizing that the information they had developed as to the theory of fluid mechanics, laboratory experiments and research in general all pointed toward the conclusion

that additional wells beyond the required minimum do not increase recovery of oil, they, nevertheless, recognized that some people believed that there were very little evidences to the contrary; and so, they undertook to make as exhaustive a study of field evidence as was possible to see whether their views were supported in fact or not supported by such field evidence.

So they compiled data on some 100 odd oil reservoirs in the United States as to their ultimate recovery and physical characteristics, and the geology and the nature of the contained fluids. And those data were studied in detail, and published in a separate paper by Mr. R. C. Craze and me in 1945. That paper and the data have previously been referred to by Mr. Callaway this afternoon. In summary, that data showed that although the effects of factors such as oil viscosity and oil pressure decline and other things, the effects of all those factors could be clearly seen in these data, but there was no indication of any effect of well spacing itself on ultimate recovery.

These figures varied from a low in spacing of 2.5 or 6 acres per well to a maximum of from 65 to 66 acres per well.

Q Mr. Buckley, In the April 16th hearing Mr. Tesch referred to Dr. Tomlinsom and his theory. I would like you to tell the Commission whether Dr. Tomlinson has expressed himself in regard to the API study you have just discussed.

A Dr. C.W. Tomlinson of Ardmore, Oklahoma, has expressed himself quite a few times as to this paper. Mr.Tomlinson undertook some four years after the paper was published to make an analysis of the data, and he arrived at a different conclusion. He reached the conclusion by his method of interpretation, using part of the data, not all of it. And it was by using a peculiar method of averaging that he was able to interpret these data to support his view that more wells do recover more oil.

I think his points were answered particularly and in some detail by Dr. W. V. Vietti, Chairman of the API Well Spacing Committee in a discussion before the Petroleum Branch of the American Institute of Mining and Metallurgical Engineering in San Antonio, Texas in 1949.

Also, in view of the questions raised by Dr.Tomlinson, the API Well Spacing Committee itself undertook a further review of the data and Dr. Tomlinson's interpretation of it and that made by Mr. Craxe and myself.

In a meeting of September 15, 1949, in Dallas, Texas that group issued a statement which I would like to read an excerpt from, if I may.

Q Please.

Q And I quote from minutes of the meeting of the Well Spacing Committee of the API Held in Dallas, Texas, September 15, 1949.

"This Committee has carefully reviewed the method employed by Dr. Tomlinson in his interpretation of the data assembled by the Committee as well as the basis of his conclusions. It was the unanimous conclusion of those members present at the meeting of the Well Spacing Committee in Dallas, Texas, on September 15, 1949, that Dr. Tomlinson's utilization of only a selected portion of the data and method of interpretation was technically faulty, resulting in serious distortion of the facts, and that his conclusions could not be supported from the data in question."

Q Mr. Buckley, I would like to introduce that as Humble Oil and Refining Company's Exhibit 1 at this time.

A For the purpose of the record, I would like to point out at this time the exhibit itself is an excerpt from the minutes rather than a transcript of the entire proceedings.

MR. SHAVER: Will you receive that?

COM. SPURRIER: Without objection, it will be admitted.

Q Mr. Buckley, are you familiar with the fact that the Research and Coordinating Committee of the Interstate Oil Compact Commission has recently reviewed the whole question of well spacing, including your work and that of Dr. Tomlinson?

A I am familiar with the fact that the Research and Coordinating Committee of the Interstate Oil Compact Commission

has recently reviewed the whole question, including the paper I mentioned previously, Dr. Tomlinson's interpretation thereof, and a number of other works by other authors.

Q What did this Committee have to say about your work and that of Dr. Tomlinson's comments on it?

A This Committee, after its study, issued a report that was adopted at the Fort Worth meeting of the Compact Commission in September 1951. And if I may read from that report, and I quote, on page 47 appears the statement,

" The Craze and Buckley approach to the spacing problem was strictly one of analysis of statistical data. * * * In the present study it is concluded that the work is comprehensive, thorough, and dependable as possible through statistical analysis."

With reference to Dr. Tomlinson's interpretation of these data, the Committee recognized, as did Mr. Craze and I, that there were certain limitations of the statistical approach. These limitations, I might point out, had been cited by Mr. Tomlinson in criticism. The Committee pointed out, "If the question is justified, then Tomlinson's own analyses of the date loses its value * *".

The Committee went on further to state, and I quote on page 50, "We find nothing in this latest report to support Tomlinson's advocacy of close well spacing."

Of this latest report, they had reference to a statement made by Dr. Tomlinson before this Engineering Committee in

which he included not only his views as to the date Mr. Craze and I had published, but at the same time, his views on the energy relations involved in the recovery of oil..

Q Mr. Buckley, aside from the specific issues you have discussed, what general conclusions did the Committee reach?

A The Committee issued an extensive report based on a study of the entire question. They reached a number of very specific conclusions. In general, I believe they support the views I expressed earlier: that there are a number of factors that influence the recovery of oil, and those that are controllable must be controlled in order to influence the ultimate recovery. But the mere drilling of additional wells solely for the purpose of increasing the well density does not, in general, have any -- add materially to the ultimate recovery.

Now, I have in effect paraphrased what I think to be the substance of their conclusions. If it is important, I would like to read a few --

Q I was wondering if you wouldread those, and also give the page identification in the report.

A On page 46 as conclusion No. 7, I quote:

"In either solution gas, water-drive, or combination drive reservoirs, the ultimate production of oil is independent, within reasonable limits, of well density."

Conclusion No. 8, and I quote:

"Assuming the same efficiency in other features of reservoir development and control, the greater the well density the shorter may be the time in years required to produce all the recoverable oil from a reservoir. This should be qualified on two counts:

"(a) The total oil required from a field to fill market demand might be produced as efficiently from fewer widely spaced as from many closely spaced wells.

"(b) The total oil that could be produced from a reservoir without physical waste might be as efficiently produced from fewer widely spaced as from many closely spaced Wells."

On page 54, Conclusion No. 9, and I quote:

"The basic considerations in movement of fluid in oil reservoirs are applicable to either sandstone or limestone-dolomite reservoirs."

On page 54, No. 12:

"If the aim in reservoir control be that of securing the greatest ultimate recovery of oil from the reservoir as a whole, the question of location of wells ceases to be that of density, or spacing on some geometric pattern. Rather, well locations will be chosen to fit structural and reservoir characteristics or peculiarities, including the many possible variations in different sections of the same pool."

With particular reference to the proposed rule before

this Commission regarding spacing during the early development, I would like to quote Conclusion No. 12 on page 46 of the aforementioned report:

"Where land lease controls permit, new oil fields could be first developed on wide spacing patterns. Final well density and other development and production practices could then be determined in the light of geological, engineering, and economic information developed."

I would like to explain that in this report two sets of conclusions were arrived at. The report was, in effect, preceded by a set of conclusions, and there were a set at the end. These two sets of conclusions were in slightly different language; the second set being, in effect, an amplification and explanation of the first set.

I have selected those I think particurlarly pertinent to the issues before this Commission. In general, I think the views expressed in all the conclusions are in substantial agreement with the views I have expressed.

Q Mr. Buckley, After reviewing all these studies, do you believe there is any technical controversy on well spacing?

A Frankly, I do not. There has been a great to do from time to time about the so-called effect of well spacing on ultimate recovery. In my opinion, there is no real technical controversy and hasn't been for many years. There

have been a few individuals whose local experiences or other reasons have caused them to be outspoken in advocacy of close spacing. I believe their views have been thoroughly discredited and are not subscribed to by any important segment of those whose business it has been to become really informed on the technical aspects of recovery and conservation. I think it is clearly evident those that have clearly studied the question from a technical standpoint are almost in unanimous agreement with the views I have expressed. This was true of the Oil Compact Engineering Committee in its report of '42, and the API Well Spacing Committee in its report of '42. And true again of the Engineering Committee of the Interstate Oil Compact Commission, published in Booklet form in 1951. And I think it was corroborated fully in the September 1951 report I have just quoted from of the Research and Coordinating Committee of the Compact Commission.

I believe that these groups represent, in the aggregate, a substantial cross-section of informed opinion, both in the industry and among the state regulatory bodies.

Q Mr. Buckley, in conclusion, do you have anything further to present to the Commission?

A With regard to the proposed rule itself, I would like to give one additional brief quotation, if I may, from the recent booklet published by the Engineering Committee of the Interstate Oil Compact Commission. The Engineering

Committee is a different committee from the Research and Coordinating Committee. They published a book entitled "Oil and Gas Production" in 1951, which described in more or less popular terms the behavior of oil and gas fields and those controls necessary to effecient recovery. I quote:

"For proper reservoir control in new fields it is important to determine as promptly as possible the structure, the reservoir-rock characteristics, the extent of the reservoir, the magnitude of reserves, the primary reservoir-energy source, and the type of reservoir control which will permit the greatest recovery. These data can best be determined by drilling new fields on the widest practical spacing pattern. Wide-spacing-development programs afford information that may be used to locate the most advantageous structural position for the drilling of future infill wells, and eliminate the expense of drilling many unnecessary wells. Each reservoir presents a separate problem in the determination of the well-spacing pattern."

Q Do you have anything further in conclusion?

A I have nothing further to add, except to reaffirm my conclusion it is technically sound, and I believe it to be in the public interest, and I believe it to be plain commonsense to develop those pools on a basis which will minimize the drilling of unnecessary wells.

MR. SHAVER: We would like at this time to introduce these reports and booklets he has referred to. We will number them 2, 3, 4, 5, and 6. If you would like additional copies, we have them available.

COM. SPURRIER: Without objection, they will be admitted.

THE WITNESS: Mr. SHAVER, you have introduced two I didn't mention, but which I think will be helpful.

MR. SHAVER: One, Mr. Buckley, is "Petroleum Conservation" and the other is "Petroleum Productive Capacity."

THE WITNESS: A report of the National Petroleum Council on the future availability of petroleum in the United States.

MR. SHAVER: I think they are pertinent to the inquiry and would like to introduce them.

(Off the record.)

COM. SPURRIER: Are there any more questions of this witness?

MR. GRAHAM: In the studies in which you participated, were there actually any 80 and 40 acres?

A You mean, I, personally have studied?

MR. GRAHM: Yes, sir.

A Yes, sir, I have studied or had access to data in fields in which spacing has gone to much wider spacing than that. Not necessarily as to whole pools, but as to substantial

portions thereof.

MR. GRAHAM: No further questions.

COM. SPURRIER: Are there any other questions? If not, the witness may be excused.

(Witness excused.)

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MR. KELLAHIN: If the Commission please, Jason Kellahin for Phillips Petroleum Company. I would like to call as our concluding witness Mr. Folsom, as an independent operator -- independent observer -- to express his conclusion on the question before the Commission.

In the interests of saving time, Mr. Folsom has prepared a statement which rather than presenting by questions and answers, we would like to have him read into the record, if that is satisfactory.

CLARENCE B. FOLSOM, JR.

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A Clarence B. Folsom, Jr.

Q By whom are you employed, Mr. Folsom?

A I am employed at the New Mexico School of Mines as head of the Petroleum Engineering department.

Q What is your education in the field of petroleum

engineering and geology?

A I hold the degree of petroleum engineer from the Colorado School of Mines, and the degree of Master of Science in petroleum engineering from the same institution.

Q What year?

A The first degree in '41 and the second in 1952.

Q Have you had any practical experience in the field of petroleum production?

A Yes, sir, employed by Phillips Petroleum Company for the period 1941 to 1946, and in my present capacity from 1947 until the present time.

Q You have been head of the Petroleum Engineering Department at the school since 1947?

A That is correct.

Q Have you made a study of the question that is before the Commission in regard to this proposed order, Mr. Folsom?

A I have.

Q Have you prepared a statement on that question?

A I have.

Q Would you read that into the record, please, sir?

A Governor and Members of the Commission and interested spectators:

I appear this morning to add my voice to those who advocate the adoption of the motion, pending before this Commission. I am in full accord with the aims and purposes of the motion,

and I heartily recommend its adoption. I take this position with certain reservations, however. We must not consider this motion as the final solution to the problems of well-spacing and well patterns. It has certain merit as being indicative of an attitude on the part of the Commission. It indicates to the industry that we are ready to consider each oil and/or gas pool, on its own merits, and will no longer attempt to apply a rigid, unvarying rule to all pools regardless of their physical characteristics, geometry, and type of drainage mechanism.

Our knowledge of the mechanics of reservoir drainage has increased tremendously since the Conservation Act was passed in 1935. We now realize that the ultimate recovery from oil and gas reservoirs depends on many factors, most of them inherent in the reservoir as discovered, and not subject to modification. Among these are the permeability, porosity, and saturation of the reservoir rock, the viscosity, the nature of the reservoir fluids, the pressures on these fluids, and the geometry of the system.

It has been calculated that between two identical reservoirs, having a permeabality of 15 millidarcys and developed on 40 and 80 acre spacings, respectively, the difference in per cent of original oil in place, recovered, is less than 0.2 of a per cent; and only 0.3 of a per cent in the case of 40 vs. 160-acre spacings. The same reservoirs will produce an addi-

tional 3 per cent if the permeability is increased of 300 md. I mention this to point out that the maximum recovery from an oil or gas pool depends primarily on the inherent physical characteristics of the reservoir and its contained fluids, and only secondarily on the spacing between wells.

With our present knowledge, and sufficient data on the new reservoir, it is now possible to calculate for each new pool, an optimum spacing which will provide the greatest maximum recovery of fluid, at the least cost, with a satisfactory return on theinvestment.

It might be argued that our concern is limited to the maximum recovery of our reserves, but we must realize that there will be no recovery at all unless we encourage exploration and development by a proper attention to the other factors.

What then is more logical than that we should set a temporary spacing in all new oil and/or gas pools until sufficient reservoir data has been obtained to permit a determination of the optimum spacing?

Our ultimate aim in conservation is the most efficient recovery possible consistent with proper control of the pressure decline, gas-oil and water-oil ratios, and use of the reservoir energy. Therefore, it is recommended that the first wells in a new area be drilled on a wide spacing designed to furnish quickly that information regarding the

geology, geometry, and physical characteristics of the reservoir upon which the best, most economical program of development for that particular pool will be based.

This optimum spacing may turn out to be anything from one acre to 500 acres or more. The odds are against it ever being exactly 40 acres. This, in itself, argues against the validity of a rigid, arbitrary, state-wide spacing rule. It is this very flexibility which we must seek. And this proposed rule is a step, but only a step, toward our goal.

It is entirely possible that the evidence furnished by the pool itself will support a wider spacing than that which we propose for the initial stage of development. It is also possible that the optimum spacing may vary from one area within the pool to another.

If we start with a wide spacing it will be easier to drill subsequent wells should they be shown to be necessary to properly recover the oil from the pool, or to meet the market demand; whereas the use of close spacing in the initial stage may result in the drilling of unnecessary wells and the consequent economic waste which we are pledged to avoid. Once started, this waste can never be overcome, even by the most efficient reservoir manipulation.

It is my opinion that the question of well spacing is hampering the efforts of engineers to achieve more efficient recovery, instead of assuming its proper position as a minor

factor. In many cases, the close-spacing advocates have prevailed with the result that the excessive expenditures of capital have had to be offset by excessive allowables to prevent premature abandonment. And this has defeated the efforts of engineers to obtain the maximum, ultimate recovery of oil from the reservoir.

Certainly, if we were to mine the reservoir sand, we would achieve complete recovery. Therefore, it is within reason that the per cent of total recovery will increase as the wells are placed closer together. But the increase in recovery, in the region of well spacings within the realm of practical operation, is so small (a fraction of a per cent) that it can be easily overcome by the increased cost of development and production. It is possible that in the case of older shallower fields the small increase in production, due to infill drilling, will exceed the additional investment, and possibly provide a small profit on the operation. But in the case of deep pools requiring investments approaching a million dollars per well, it is doubtful if even a small percentage of the investment can be returned out of the slight additional recovery.

I suspect that many of the advocates of infill drilling who point to their success in shallower areas will find that our deeper horizons do not present the same rosy picture.

Unfortunately, perhaps the question of the relative

merits of 40 vs. 80-acre spacing has been raised here. I do not consider it to be relative to the question before us, but since it has been brought up it must be considered in the light of our present problem. The question is one of those academic questions which provide scholars with mental exercise, but which in the end add little to our reserves of petroleum. Unless we are interested in well spacings of less than 6 acres per well, the decrease in recovery, as well spacings increase, is so slight as to be unimportant in compairson to the cost of drilling the additional deep wells necessary to obtain the additional oil.

The day is approaching when the industry will be faced with the problem of choosing between a number of areas in which to invest exploratory funds. The past few years have seen many areas closed to exploration because of legal and other difficulties but these obstacles have now been removed, and, as capital funds become more restricted, the industry will be forced to choose those areas in which, in case of a discovery, they will be allowed to develop the pool in accordance with the best engineering practice. If we in New Mexico are willing to recognize new advances in the field of reservoir technology, and carry out our conservation program accordingly, the oil industry will be willing to invest their capital in our state. The result will be increased production and reserves, with increased tax revenues for the state. The advantages to our

state will far outweigh the slight loss of ultimate recovery, if any. In any case, it will be possible for the original discoverer of the pool or his assigns to carry out infill drilling at a later date if it should prove feasible.

As I pointed out earlier, this is only a first step toward an ultimate goal. After we have had time to observe this new rule in operation, we may wish to remove the depth restriction as well as the provision for a stated, final spacing.

Some further mention should be made of well patters. I am no now, and never have been, convinced that the most efficient recovery is achieved by placing our wells in the center of legal land sub-divisions. This is certainly the case in those fields producing under the influence of an active water drive. I realize that to depart from our present rule at this time would be fraught with legal difficulties; nevertheless, if we would strive for true conservation we must soon consider the advisability of allowing irregular patterns, based on the geometry of the reservoir system and the type of drive in operation on the pool.

In adopting a wider well spacing, we need not alter the proration unit now in use for allocating production. Many of those who argue for close spacing assume that the additional wells will increase the amount of production allocated to the acreage. If allowables are based on the proration unit, rather than on a per well basis, the number of wells on a proration

unit can be viewed in its proper economic aspect, and much of the opposition to this proposed motion will disappear.

In arriving at a decision in this matter, we must not lost sight of the obligation we are under to promote exploration, discovery, and development of new reserves in New Mexico; to prevent physical waste through excessive production; to prevent economic waste; to secure the maximum ultimate production of our reserves; and to protect the correlative rights of individuals. These factors complicate the problem, but there is a solution, simple in form but complex in operation, which will accomplish our purpose.

I believe that in the matter of conservation of oil and gas the best interests of the state are identical with those of the oil producers. What is good for either is good for both. We are all interested in obtaining the maximum benefits from our natural resources. And if we continue to work together as we have in the past, we will all prosper; producer, royalty owner, and consumer alike. The proposed motion is in the best interests of all concerned, and I can find no valid, technical reason for opposition to it.

New Mexico has long been a leader in the field of oil and gas conservation. Our operations have served as a model for other commonwealths faced with similar problems. I hope that we will continue to demonstrate our leadership by being the first to abrogate the policy of rigid, statewide spacing;

thereby recognizing the individuality of oil and/or gas pools.

Q Do you have anything you care to add to your prepared statement, Mr. Folsom?

A I thought Mr. Beall submitted some very fine data for the consideration of the Commission; particularly when he pointed out in the case of a 13,000 ft. well you would have to have six times the oil present to pay out the cost of the well as you would have in a 5,000 ft. well. I think it should be further pointed out that this is rather unusual; to find a deep pool with a six-to-one ratio of oil saturation. However, if we cut the number of wells in half, we cut that ratio in half, which would require then a three-to-one ratio, which isn't difficult to picture. I think that should be brought out.

MR. KALLAHIN: That concludes our examination. Any questions?

COM. SPURRIER: Are there any questions of this witness? If not, the witness may be excused.

(Witness excused.)

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COM SPURRIER: Is there anyone else to be heard?

MR. WOODWARD: If there are no other witnesses, we would like to make a statement.

COM. SPURRIER: Very well.

MR. WOODWARD: In view of its interest in spacing in this state in the last 23 years, Amerada Petroleum Corporation would like to make this additional statement of its position with regard to the proposed rule.

We recognize oil fields are not identical, and it has always been our contention each pool should be spaced on its facts. The Bagley, Knowles, and Hightower reservoirs indicated and subsequent development confirms one well would efficiently drain 80 acres. Accordingly, we supported 80 acres. We didn't consider conditions in the Saunders Field, and other pools in which we had a similar majority interest, justified 80-acre spacing, and did not ask for an 80-acre spacing in those fields.

We are not advocating 40, 80, or 160-acre spacing in this hearing. In supporting the proposed rule and urging its adoption, we are contending there is a right time to permanently space oil fields; after sufficient facts are in, and before development has progressed to an extent that proper spacing, as a practical matter, is impossible.

COM. SPURRIER: Anyone else?

MR. DAILEY: My name is Homer Dailey, representing the Continental Oil Company.

We wish to make a statement in favor of the proposed rule.

Adoption of the rule would make possible the accumulation of the data necessary to properly evaluate the reservoir. If the factual data supports such a program, this rule will enable

the operators to develop these reservoirs of greater expense and risk on a program of spacing wider than that now possible. Furthermore, the uniformity of spacing protects correlative rights in that allowables may be distributed equally without question of discrimination. And affords flexibility in that the density of wells may be increased without complications in the event that such action is directed by the Commission.

This proposed rule is a sound step toward better conservation of petroleum resources, and should provide additional incentive to drill other deeper horizons.

COM. SPURRIER: Anyone else?

MR. UPCHRUCH: Attorney for Gulf Oil Corporation.

At the November hearing Gulf went on record as recommending the adoption of this proposed 80-acre temporary spacing rule. We would like again to re-state our position, and recommend adoption of this temporary 80-acre spacing rule.

COM. SPURRIER: Anyone else?

MR. GANNON: For the Texas Company.

We would like to concur in the Committee report submitted this morning by Judge Foster, and recommend the proposed rule be adopted.

MR. NASON: R. O. Nason for the Cities Service of Bartlesville, Okla.

Mr. Chairman, I would like to make a brief statement of our position. We concur in the recommendation of the Committee

with the exception of federal acreage to a regular spacing pattern. We would like to call your attention to the evidence as it has developed here. We think that the evidence has been overwhelming in favor of 80-acre development units. We think that the operator that goes out and drills to a depth below 10,000 is entitled rationally and reasonably to consideration.

The evidence of Mr. Beall showed the discovery well, where it is below 10,000 ft., costs between $300,000 and $1,000,000 to drill. We disagree with Mr. Tesch in that I believe that when you analyze his testimony he is opposed to spacing of any kind. If you will go into his testimony, he is opposed to any kind of development units, and he is opposed to the conservation practices that have grown up in the industry. We feel that when a man bets his money and goes in and drills a well to a depth below 10,000 ft, he is entitled to that consideration. Not only that, and it is recognized in every state I know of, the discoverer of a new pool is given consideration. We feel that when -- now, I want to call your attention to Mr. Beall's testimony.

He testified that as far as pools are concerned, when you get below 10,000 ft, they are no more likely to be Golcondas, so to speak, than when they are above 10,000 ft. And we feel that the man that bets his money -- and we agree with Mr. Tesch on this -- he ought not to be compelled to

step out from 1,866 ft. to a half mile to offset his own well. Now, I will admit that you may have something of a cluster there. But all this testimony with reference to infill wells is applicable to the rule if you drill it before with reference to diagonal spacing.

That is our position as we stated it at the commencement of this hearing in April. And that is our position now. And we feel that if that part is stricken from the proposed rule, that it will tend toward the development of the oil reservoirs of new Mexico.

I believe that that states our position fully. Thank you.

COM. SPURRIER: Anyone else?

MR. ELLIS: H. C. Ellis of Artesia, N. M., with Buffalo Oil Company.

I would like to state our position as regards the proposed 80-acre spacing. We are heartily in accord with that spacing.

COM. SPURRIER: Any one else?

MR. BROWN: D. C. Brown, Sun Oil Company.

We have gone on record about four times already as being in favor of this proposal, and I will make it the fifth.

COM. SPURRIER: Anyone else?

MR. SELINGER: George W. Selinger, representing Skelly Oil Company.

Skelly Oil Company wishes to add its voice to the voices of the vast majority of the industry pleading with the Commission to adopt the rule. In 1935 the Commission of this state was faced with a very difficult problem, and I believe this Commission will meet the problem it is faced with now as courageously as its predecessor. I believe this Commission will not be subject to any criticism in the adoption of this rule for two reasons: one, that this is a temporary spacing rule in which a permanent rule is not adopted until after all information is disclosed and presented to the Commission in very concrete form. Secondly, the rule places a burden upon industry, and the industry welcomes that burden, in proving to this Commission after 18 months of drilling, or drilling of six wells, that 80 acres is necessary.

Now, with those two restrictions, those two defenders from criticism, I believe this Commission can adopt a temporary spacing rule as sought by the industry.

COM. SPURRIER: Anyone else?

MR. JOHNSON: J. P. Johnson with Atlantic Refining Company.

We would like again to state our position in favor of this temporary spacing order.

COM. SPURRIER: Anyone else. If there is no one else to be heard, we will take the case under advisement.

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BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

April 16, 1953

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Case 407: This is a continued case. The Matter of the Application of the Oil Conservation Commission upon its own motion for an order extending Section G (Oil Proration and Allocation) to provide for the addition of Rule 508, Establishment of a Temporary 80-Acre Proration Units - said proposed rule to provide as follows:

1) Temporary 80-Acre proration units are hereby established for a wildcat well as defined in Rule 104a completed as oil wells with a pool depth range of 10,000 feet or more determined in accordance with Rule 505a.

2) After the effective date of this order, no owner of a producing well completed as a wildcat with a pool depth range of 10,000 feet or more shall be required to drill more than one (1) well to each 80 acres in order to secure his proportionate part of the production.

3) Upon the completion of five (5) wells to the same producing formation, within a radius of two miles of a wildcat well, the burden shall be on the operator to show by competent evidence that one (1) well will efficiently and economically drain the 80 acres assigned to the well,

and such other provisions as may properly be included therein as supported by proper testimony and evidence produced at said hearing.

MR. KELLAHIN: If the Commission please - Jason Kellahin of Phillips Petroleum Company.

MR. SPURRIER: Mr. Kellahin.

MR. KELLAHIN: I'm sorry. I'll withdraw.

MR. SPURRIER: Does the committee appointed by the Commission have its report ready at this time? Mr. Hanners?

MR. HANNERS: G. T. Hanners. We do have a - - - If the Commission please, we have at this time ready to file with the Commission a report of the Committee heretofore appointed by the Commission but we do not have enough copies of the report to circulate. I would therefore like to read it for the committee. The letter appointing this committee directed it to report on the three features of a proposed spacing rule and also to report on any questions that the committee may desire, the wisdom of the proposed rule not being fair and Bliss, Amerada and Magnolia members of the committee having advocated such a rule, the Chairman Harry Leonard, acting chairman G. T. Hanners and committee-member F. J. Danlade felt that the independent disinterested petroleum engineers should be consulted as to the questions and problems necessarily connected with the proposed rule before any attempt be made to report on the three specific features of the rule. After consultation with R. W. Tesch, an independent and disinterested petroleum

engineer and geologist and after a thorough study of the proposed rule, it is the considered opinion of the undersigned chairman and committee members that the features of the rule are so foreign to the orderly development of the oil pools of this state that no further consideration should be given to any of the features of the proposed rule and that the rule, in its entirety should be rejected. Not only would the adoption of the rule hamper the development of the fields but it would tend to the reduction of the recovery of oil and thereby to the creation of waste. We therefore recommend that the proposed rule be rejected for the following general reasons:

First: The adoption of such a spacing rule for new fields in advance of their discovery necessarily assumes that all fields are identical and that one well will always adequately and efficiently drain and develop 80 acres which experience in New Mexico fields has shown not to be true.

Second: Each field after discovery should be judged on its own particular condition and if peculiar condition warrant exception to the normal rules, the same should be considered after the establishment of facts warrant it; but adoption in advance of exceptions is necessarily based on false premise.

Three: The public policy of New Mexico as expressed in the recent session of the Legislature is for the Commission in establishing proration units to consider the - - - among other things, the rights of royalty owners and reduced recovery and physical waste which result from too few wells and the adoption of the proposed rule in advance of discovery of the field or any technical data or knowledge would thwart the expressed intent of the Legislature.

Four: Although the proposed rule is disguised as a temporary one, practical experience in such matters convince impartial observers that the actual effect of it would be to shift the burden of proof to the royalty owners and that the rights of royalty owners, including the beneficiaries of our state lands, could be jeopardized.

Five: The orderly development of oil fields would be hampered by the adoption of any rule that sanctioned the drilling of fewer wells than reasonably necessary to efficiently and adequately drain and develop the field and that waste of natural resources would thereby be created. A copy of the report of R. W. Tesch, petroleum engineer and geologist, setting

forth his conclusion in more detail and in a more technical manner, after study of the proposed rule and questions and problems necessarily connected with it, is attached to this committee report as Exhibit A.

Mr. Tesch is presently present and prepared to testify with respect to his conclusions and in support of this report.

We respectfully recommend that the proposed rule in its entirety be rejected.

Signed Harry Leonard, Chairman - myself - and Ed Danlade as committee members.

The report has attached to it the conclusion of Mr. Tesch.

MR. SMITH: I'm J. K. Smith of Stanolind. May I inquire, Mr. Hanners, if the other three committee members have submitted a report?

MR. HANNERS: The other three committee members, as indicated in the report, advocated the rule and at earlier hearings had submitted a suggested rule.

MR. SMITH: Am I to understand then that the report that is submitted is a report merely of the - - with the recommendations - - a report merely of the three committee members named therein.

MR. HANNERS: That is correct. As a matter of fact, the committee found itself hopelessly deadlocked.

MR. SMITH: I should like to suggest to the Commission that this is not a committee report but a report of three members of the committee.

MR. SPURRIER: Mr. Hanners, do you want to put Mr. Tesch on the stand to be sworn?

MR. HANNERS: I have assumed that if there is to be a request made for the adoption of the method, that the proponents/order of the would have technical proof for the Commission as well as transcripts of it to show such proof. We feel that the fule should not be adopted and we find ourselves rather in a defensive position and it occurred to me that if the proponents of the rule have technical evidence that they desire to submit to the Commission, we feel our position is somewhat that of the defendant rather than the plaintiff.

MR. SMITH: May it please the Commission, I was under the impression that the Commission had made the suggestion on its own motion and that therefore there are no proponents of the rule other than the fact that the Commission

wishes information respecting the advisability of it.

MR. SPURRIER: Is there anyone else who would like to be heard in this case? Proponents or opponents?

JUDGE FOSTER: Mr. Chairman.

MR. SPURRIER: Judge Foster.

JUDGE FOSTER: E. H. Foster representing the Phillips Petroleum Company. The committee report here -- or the minority report -- or the report, however you want to identify it, comes as somewhat of a surprise to say the least. It was my understanding that after the first committee meeting that the chairman would call another meeting for further discussion of this matter and as one member of that committee, I have waited to hear that call but it never came. Now, it occurs to me that this report which has been submitted here, without any sworn testimony, couldn't possibly be received as a committee report. It doesn't represent any more than just the views or ideas of three members of that committee. It seems to me that the proper procedure should be for those who want that report adopted to support it with some sworn testimony. I believe that the committee report states that the engineer is here and available to testify and that that report will be supported with his sworn testimony. Now, I believe it would be orderly to proceed in that manner, if I might make that suggestion to the Commission. Certainly, I would like to ask the witness some questions and I think he really should be put on the stand in support of the statements that have been made in the motion. Now, no other member of this committee as far as I know has been furnished even with a copy of this report. That's a little unusual to say the least. It seems to me that just as a matter of courtesy, the other three members of the committee should be given a copy of that report. That would appear to me just to meet the eye. And if what's in the record here is not supported by any testimony on this report or anything of that kind - it seems to me this witness should be called to testify.

MR. HANNERS: Mr. Chairman.

MR. SPURRIER: Yes, sir.

MR. HANNERS: May I make a suggestion to the Commission?

MR. SPURRIER: Certainly.

MR. HANNERS: The committee being hopelessly deadlocked and three members

having appeared before the Commission at an earlier hearing and submitted the proposed rule which has been submitted here this morning. We would recommend to the Commission that the proponents of the rule submit their technical data and we have Mr. Tesch available to support our report - it being a negative report, we feel that the proponents should proceed first but whatever the Commission desires, we will abide by. However, we recommend that the plaintiff take the burden of proof and the defendant the exception.

MR. SMITH: I object!

(Laughter)

MR. SMITH: May it please the Commission.

MR. SPURRIER: Mr. Smith.

MR. SMITH: I should like to move at this time that the report attached to the purported report of the committee be stricken as being an ex parte statement unsworn by the witness from consideration by the commission.

MR. SPURRIER: In view of what you have said and in view of the fact that Mr. Tesch is here, the Commission would like to have Mr. Tesch take the witness stand to testify both to direct and cross.

MR. HANNERS: Mr. Tesch will you come forward, please?

JUDGE FOSTER: I wonder if there is available copies of this report?

MR. HANNERS: There are not too many, judge. But there are enough to get to all of our members.

JUDGE HANNERS: We only need three.

(Laughter)

R. W. TESCH

having first been duly sworn, testified as follows:

DIRECT EXAMINATION

By MR. HANNERS:

Q. Your name is R. W. Tesch?

A. Yes, sir.

Q. Do you live in Ft. Worth?

A. Yes, sir.

Q. What is your occupation?

A. I'm a petroleum consultant.

Q. How long have you been engaged in this type of work?

A. I have been consulting as an independent since 1949.

Q. What was your experience prior to that time?

A. My experience prior to that time consisted of a degree in petroleum engineering from the Colorado School of Mines in 1933; graduate of the North Texas School of Law; experience in the oil fields since 1933, starting with Stanolind Oil and Gas Company in 1933 till 1942. In 1942 and until 1945, I was with the Army Engineers.

Q. Mr. Tesch, I believe you have previously testified before the Commission?

A. Yes, sir.

Q. And your qualifications have been admitted?

A. I assume so.

Q. When did you first become acquainted with oil conservation matters in New Mexico?

A. My first experience in New Mexico was in 1934 when I was employed by the Stanolind Oil and Gas Company. Actually, as far as proration is concerned, it started in 1935 at the time the first conservation rules were put in by the Commission. I have been acquainted with them since that time.

Q. Are you engaged in the production of oil and gas in your own right?

A. Yes, sir. In Texas. Unfortunately, not in New Mexico.

Q. Do you have any producing or royalty interests or financial interest in oil and gas production in New Mexico?

A. Not directly or indirectly.

Q. Mr. Tesch, were you requested by Harry Leonard, Jack Danlade and myself to attend the meeting of a committee last fall with regard to the matter that had been delegated to us by the Commission?

A. Yes, sir.

Q. After that time, did you make a study of the problems connected with -- necessarily connected with the adoption of the petroleum rule?

A. Yes, sir.

Q. You have filed as an exhibit to the committee's report a sheet showing some eight or nine conclusions. Do you have that sheet readily available?

A. I think you have it.

Q. I have one. Mr. Tesch, the letter appointing the six-member committee has asked for a report on three features of the proposed rule. After you

had begun the study, did you find it possible to accept any of those three features except by considering the rule as a whole?

A. That is right.

Q. Now, you have attached to the report an exhibit - about eight or nine conclusions - which you feel are valid objections to the bill. How would you proceed with respect to your discussion?

A. Well, I would suggest that perhaps I should read these conclusions of mine that I submitted to your committee.

Q. Will you read your first one, please, sir?

MR. SMITH: I'd like to object at this time on the grounds that there have been no proper predicate laid factually to support the conclusions. It's sort of like the cart before the horse.

MR. HANNERS: We plan to read the conclusion and then discuss them.

MR. SMITH: I renew my objection.

MR. WHITE: Will you explain your objection?

MR. SMITH: He is going to state his conclusions and there has been no testimony that the witness has done anything other than study the problem. I don't know what facts he's examined into - whether they are proper conclusions. I'd like to have cited better data to support the conclusions and then the conclusions.

MR. SPURRIER: The witness may proceed.

A. Conclusion No. 1. Many of the deeper structures in New Mexico have revealed steeply dipping flanks and complex faulting. Thus staggered 40-acre spacing with 80-acre proration units could result in one operator forcing another operator to drill at a location which might be dry or located at an inferior structural position.

Q. How would that happen under the adoption of the proposed rule?

A. It already has happened.

Q. I don't understand.

A. That same thing has already happened in the Crossroads field. Where one operator was forced to drill a dry hole on an 80-acre tract of land, then he moved over and got an oil well on the tract that he would have normally drilled at if it hadn't been for the staggered plan.

Q. Do you have an exhibit showing the matter you have just described?

A. This is hypothetical exhibit - but it actually did happen in a field.

Q. Will you have the lady mark that exhibit?

(the document was marked Exhibit 1.)

Q. What do you mean when you say it could force an operator to drill on an inferior structure?

A. Well, simply this. There are -- these deeper structures in New Mexico are so -- have such high dips and rates of dip structurally speaking, that you don't have to move very far in order to be way down dip - possibly at a poor well or in a dry hole. And the operator who drills the first well in any patterned drilling, sets the pattern and naturally he's going to drill at that -- his location at the most advantageous point he figures he can. This exhibit here is merely to demonstrate what can happen in a short distance by the operation of such a rule. I have shown on this exhibit three different operators - one operator is colored in brown with his acreage, another operator is colored green, and another operator's acreage is colored in pink. The operator in the brown section establishes the pattern. Now it so happens that he is all right because he -- his next well on a staggered plan is within the confines of the field. That throws it over to the green operator. He has to step out and drill but fortunately he's in the field. Now that operator in the pink would like to off-set him directly but under the staggered plan, he can't do that. So he's forced out beyond the limits of production of the field leaving him with 40 acres that are within the limits of the field that he has no well on. Now that actually happened in the Crossroads field.

Q. Could it happen in other fields if this proposed rule is adopted as in the Crossroads field?

A. It certainly could and it is very well evidenced by the fact that nearly every operator in the field below 10,000 feet, at one time or another, including the Phillips and Amerada and all proponents of this matter, have drilled on 10-acre spacing simply to get better structural position.

Q. By ten-acre spacing, I assume you mean 330 foot instead of 660 foot location?

A. That is right.

Q. And what would be the purpose of this 330 foot location?

A. The purpose of it is, obviously, to get better structural position. I don't blame them a bit. I'd do the same thing myself, if I were in their position. But I wouldn't be advocating that somebody else step over 1,800 or 1,900 feet to drill another well.

Q. Do I understand then from your statement on the first problem that the adoption of an 80-acre spacing unit might compel an operator to drill at the - - beyond the limits of a field?

A. That is entirely correct.

JUDGE FOSTER: I object to that question. The question before this Commission is not of 80 acres or 40 acres. As far as this proposed rule is concerned, it doesn't establish 80-acre spacing in New Mexico. As I understand the proposed rule and the call is simply a question of whether or not you should have a temporary 80-acre rule for the purpose of collecting reservoir data so that the Commission will know after five wells have been drilled or at the expiration of 18 months, whichever event occurs first, what the nature of the reservoir is and whether it then should or shouldn't continue with the 80-acre pattern in the field or revert to the 40-acre pattern. And the rule as proposed, as shown in this record, is that at the end of this time, why then the burden is upon the operator to come in and show that the matter should continue on an 80-acre pattern. I don't see any room here, under the issue before this Commission, to debate or consider for one moment the merits of 40-acre spacing as against 80-acre spacing. That's simply not before the Commission. And this question is based upon the assumption that this Commission has before it the question whether it ought to adopt 80-acre spacing in New Mexico. And I submit that that's not the issue before this Commission at all.

MR. HANNERS: If the Commission please, it is my understanding that the Committee was to consider the extension of Section G to provide for a temporary spacing rule - that the rule had not yet been adopted - that the matter is now before the Commission for advisement and we think it is entirely proper for this witness to state his reasons why an 80-acre rule should not be adopted and why the 40-acre spacing pattern should be followed

until technical information proves that a departure from it is warranted. We assume that the rule itself has not already been adopted.

JUDGE FOSTER: But the question calls for him to state whether or not there ever should be 80-acre spacing in New Mexico and that's not the issue before this Commission. The rule proposes to furnish a means of providing reservoir data on a particular field so that any operator there in that field can come in before this Commission and lay the facts before them as shown by actual drilling and core analysis before this Commission in order that the Commission may more intelligently apply the spacing pattern for that particular field. It isn't a question of whether we should have 80-acre spacing in New Mexico or whether we should have 40 or whether we should have 20 or some other spacing pattern. That's simply just not before this Commission under the call and this question calls for his opinion on whether New Mexico ought to have 80-acre spacing. Nobody, as far as I know, presently supporting the proposed order of the Commission, is advocating at this time that New Mexico ought to go to 80-acre spacing. All we're saying is that the Commission has in times past, granted 80-acres in this state. But in some instances, perhaps the Commission has acted a little too hastily and granted it without having the proper information before it. Now the only way that this Commission can function at all, with respect to any particular field and what the pattern in the field should be, is to give it the chance to make it and that's the purpose of this proposed rule, as I understand it. Not whether you ought to have 40 or whether you ought to have 80.

MR. HANNERS: Judge, may I have a copy of your proposed rule which you circulated this morning?

JUDGE FOSTER: I believe that's it. It doesn't propose that this Commission adopt 80-acre spacing in this state at all. It simply says that you hold the matter in abeyance in the field until you get the field data so that this Commission will know what the facts are and will not have to go at it by guess work.

MR. HANNERS: If the Commission please, the first paragraph of the rule, proposed rule, reads that no operator shall drill more than one well to 80 acres. It seems to me that that would establish an 80-acre pattern and

would mean an 80-acre spacing rule.

JUDGE FOSTER: That is not correct. And I'll read you the rest of the rule: The second section of the proposed rule provides that the location of the discovery well shall set the pattern for the location of additional wells drilled while the temporary 80-acre proration units are in effect. Subsequent wells drilled to the same reservoir should be located at 150 feet of the center of the quarter quarter section of the identical description of that quarter quarter section in which the discovery well was drilled or within 150 feet of the center of the quarter quarter section diagonal to such quarter quarter section. Each quarter section shall be divided into two proration units running either north and south or east and west. Third: Unless within not more than 18 months after the completion date of the discovery well or within sixty days after the completion of the fifth well of the same producing formation, within a radius of two miles of such wildcat well, whichever date occurs first, one or more of the operators of said wells files an application for a hearing to determine the permanent spacing pattern for said reservoir, such spacing pattern shall revert to 40 acres and upon such hearing, the burden shall be upon the operator or operators to show that one well will efficiently and economically drain the 80 acres, failing which such spacing pattern shall revert to 40-acres. Now, it is evident from the rule itself that nobody is advocating that this Commission should at this time, adopt 80-acre spacing. All this is, is a temporary thing, to last for the period specified, and if at that time, the operators in the field can't come in and justify a continuance of 80 acres, why then it reverts to 40.

MR. SPURRIER: We'll have a five minute recess.

(Laughter)

(The meeting recessed for five minutes)

MR. SPURRIER: The meeting will come to order again, please. Mr. Hanners.

JUDGE FOSTER: I believe I have an objection which has to be ruled on.

MR. SPURRIER: Objection overruled. The witness may proceed.

Q. In your second paragraph you have stated that 80 acres will result

in less oil being recovered than closer development. What factors have you taken into account to arrive at any such statement as that?

JUDGE FOSTER: If the Commission please, I'd like to renew the objection. I don't suppose the Commission wants to try here the merits of 80-acre spacing and that's what this second objection represents. I didn't understand that that was the purpose of the rule, or proposed rule. It seems to me that we ought to try to follow the call of the hearing at least. And if you study that second proposal that they're on right now, it seems to me that that's just a question as to the merits of 80-acre spacing - whether you ought to have or whether you oughtn't to have 80-acre spacing. And that's not the question before the Commission.

MR. SPURRIER: Judge Foster, with all due respect for your sense of propriety, the Commission has never been too exacting in its rules of evidence. We have one Commissioner here who has never heard any of this testimony, on either side, and we feel that we are trying to get information - we feel that we should let this witness proceed and then we feel that you may proceed however you wish.

MR. WALKER: I would like to add, just from a personal standpoint, I'm inclined to agree with you from a technical standpoint. However, as far as this man's testifying, for additional information for my own part, I would like to hear it. Although I can agree with you from a technical standpoint. I can't see that it has too much bearing on the question that is before us now. And that's my feeling.

JUDGE FOSTER: Just so I won't be interrupting the orderly proceedings I'll just have this objection throughout the record.

(Laughter)

I don't want to make myself obnoxious, in presenting my views.

Q. Mr. Tesch, in making the statement that an 80-acre development would reduce the ultimate recovery of oil in the field, what factors did you consider in arriving at this statement.

A. I considered that from an engineering standpoint. It is generally accepted regardless of whether you are talking about 80 acre, 40 acre or 20 acre, everything else being equal - the more wells you drill, the more

oil that will be recovered from the reservoir. Now in the case of these deep reservoirs in New Mexico, they are essentially carbonate reservoirs. And when you have that condition, you have many conditions arise, for example, that you do not have in sandstone reservoirs. Permeability is erratic; your porosity is erratic; these structures present faulting - vertical fracturing. There are many things that enter in. Not just one thing - but everything. All those that I have mentioned enter into my conclusion in that respect.

MR. HANNERS: Does the adoption of an 80-acre rule - I use that phrase loosely, Judge - -

JUDGE FOSTER: I observe that!

MR. HANNERS: Does that presume that there will be uniform permeability throughout the area?

A. Well, of course, you have got to have a lot of things that are uniform in order for everything to be equal which you do not have in these carbonate reservoirs.

Q. If a rule for 80-acre spacing be adopted in advance of the discovery of a field, does that necessarily assume that one well would efficiently drain 80 acres?

A. It would.

Q. What other geological factors would the adoption of the rule in advance of a discovery necessarily assume?

A. Well, there are many - - it assumes that the one well primarily will get all the oil out of an 80-acre pattern that it could get out of a one-acre pattern. And that assumption is just not correct.

Q. Would there be any harmful effect from this rule, Mr. Tesch, by drilling wells on an 80-acre basis with increased rate of withdrawal from the 80-acre well as compared to wells spaced on a 40-acre pattern?

A. Well, that comes back to my conclusion four. That high concentrated draws for dispersals of wells could conceivably result in large quantities of oil being trapped off by uneven encrouchment or coning of water.

Q. Would you explain a little more fully what you mean by quantities of oil being "trapped off"? Or uneven encrouchment or coning of water?

A. Well, it's been my observation that the majority of these deep

reservoirs apparently have an active water drive. Now that being the case, it's well recognized that highly concentrated withdrawals tend to the fact that you'll either have premature encrouchment of water or you'll have coning of water and in such cases as that, you loose some oil that you'll never get again. Even in the east Texas fields itself, with its active water drive, and it's water drive has nearly encrouched across the field in one or two spots, there are many areas left behind - islands of oil completely surrounded by water. Now this East Texas field was drilled on a very close pattern of one well to five acres but even in that case, you have right today islands of production surrounded by water that if you'd had water spacing you'd probably never would have got that oil.

Q. Would the spacing of oil wells on a 40-acre pattern tend to minimize the danger of water encrouchment or water coning?

A. Well, it would. Of course, you come back again to your allowable for those wells as set out by Rule 505. And that comes back again to conclusion three in regard to the economics of the matter, that Rule 505 Of the Commission provides for a higher allowables with depth and is based upon economic considerations so an operator recovers his investment at practically the same time for different depths. So you have got to go ahead and consider each reservoir by itself, each one as its own particular problem. What is good for one may not necessarily be good for the other. Each reservoir should stand on its own legs. I can conceive that there will be occasions where the economic considerations won't justify one well to 40 acres but I say again that that shouldn't be judged prior to the time that the field is discovered. You can cause a lot of hardship even with 18 months or five wells with these steep dips that we have in these fields. Some of these dips run up to better than a 1,000 feet to the mile. Well, if you force an operator to move over with a staggered plan from his normal direct off-set, you could conceivably force him off the structure entirely. And incidentally, I've had some personal experience with administration of staggered spacing. When I returned from overseas with the Army, I was assigned by the Army to the Petroleum Administration for War and the Petroleum Administration for War adopted many rules as a steel conservation matter, among which they promulgated this patterned drilling as set by discovery well.

and I can personally vouch for the fact that this patterned drilling, from the administrative standpoint, caused a whole lot of headaches and it certainly was not successful and the minute the PAW abandoned its rules, the operators forgot all about their staggered plan and went back to their regular development.

Q. Do you have a chart showing the ability of wells to make their allowables, Mr. Tesch?

A. Yes, sir. I took the April 1st schedule and it's merely a compilation of the schedule itself - - -

MR. HANNERS: Will you hand it to the young lady for marking, please?

(The chart was duly marked Exhibit 2)

Q. Now will you explain what you have on the chart that is marked Exhibit 2, Mr. Tesch?

A. All this exhibit 2 amounts to is a compilation of the allowable, the number of wells, the number of wells incapable of producing their top allowable for all fields 10,000 feet or below as designated by the Commission. This schedule shows that their are a total of 155 wells in the various fields. Of this 155 wells, only 34 are incapable of producing the top allowable for the field. The total allowable of these 155 wells is 36,106 barrels. Of that amount, the allowable for wells incapable of producing the top allowable amounts to 4,282 barrels or 11.86 per cent of the total. I merely bring that out to show that these deep wells are getting along pretty well here. They seem to be producing in pretty good shape.

Q. Does that mean that about 12 per cent of the allowable is being made by wells - - isn't being made by all the wells in the deep field combined?

A. Yes. Approximately 12 per cent of the allowable of these fields in that catagory is delegated to wells incapable of producing the top allowable of the particular field they are located in. It's a statistical summary of these fields that are under consideration at this time.

Q. In your experience, do you know of any other state that has 80 - acre spacing?

A. As far as I know, there is not.

Q. Do you know of any state that has adopted a rule in advance of discovery of a new field as to what the proration pattern will be?

A. There - not below 10,000. The State of New Mexico has a 40-acre that's set out in advance but that's a state-wide proposition also - - it's not 80-acre.

Q. Based on your experience as an Engineer, Mr. Tesch, what are the principal objections to the adoption of an 80-acre rule in advance of the discovery of the field?

A. Well, the principal objections are those I already gave. Briefly, my principal objection is that each field should stand on its own particular legs. It should be judged on its own particular conditions. It should not be prejudged. There are many danger signals when you get to wider spacing, as advocated; especially in these highly dipping structures that have been evidenced to date in this state. You have the problem of delegating large allowables to these wells in advance of knowing whether or not they are capable of producing at that rate without injury to the reservoir. Those are briefly the main objections I have in addition to this proposition of unfairness to some operators that might be caught by not having a location that would be best for their particular structural position.

Q. Are there any other matters or questions that you would like to discuss that I have perhaps overlooked?

A. Well, frankly, I see no particular reason for a rule. I think that the operators can get together and work out their own problems and not force the Commission to stand between them and any royalty owner that may have objection to their particular plan of development. I think that the operators themselves - - and I speak from experience - - along those lines, can get together and work out their own particular plan without the Commission's being forced to adopt it in advance.

Q. Is there anything else we should discuss, Mr. Tesch, before we submit to cross examination?

A. I don't think of anything at this moment.

MR. HANNERS: I yield the chair.

JUDGE FOSTER: May we have just a few minutes recess?

MR. SPURRIER: Yes, sir.

(The meeting recessed for five minutes)

MR. SPURRIER: Judge Foster?

CROSS EXAMINATION

By JUDGE FOSTER:

Q. Mr. Tesch, in submitting this report to the committee, do you recommend that the proposed rule here be rejected for the nine reasons that are set out here. Now, I'm going to go over each one of these rules with you separately in the light of what the proposed rule is. First, you say that the proposed rule should be rejected because the adoption - - -

MR. TESCH: Mr. Foster, I didn't say that. That is the committee's report. My report - - - -

JUDGE FOSTER: It's based on what you said, isn't it?

A. That's true, but - - you have my conclusions, sir.

Q. Do you agree with the committee's report?

A. Yes, sir.

Q. All right.

A. It is confined to the committee's report.

Q. You say there that the adoption of such a spacing rule in a new field in advance of their discovery necessarily assumes that all fields will be identical and that one well will always adequately and efficiently drain and develop 80 acres which experience in New Mexico fields has shown not to be true. Now, I wish you'd tell the Commission here how you get to that assumption?

A. Just a whole lot of experience, that I've seen in various oil fields in Texas and New Mexico.

Q. Well, just for the record, just tell us how you arrive at that assumption.

A. The more wells that are drilled, the more oil that will be recovered.

Q. That's your opinion?

A. Yes, sir. And it's backed up by a lot of other people, Mr. Foster.

Q. Well, that's a controversial issue, isn't it?

A. It certainly is.

Q. There are other men who are just as reputable as you who hold

a contrary view, aren't there?

A. That's true.

Q. Well, I want you to tell this Commission on what facts you base the statement that the adoption of this rule assumes that all fields will be identical and that one well will always adequately and efficiently drain 80-acres?

A. Well, if you have 80-acre development you naturally assume that that well is going to drain 80 acres efficiently.

Q. But you say that these proposed rules do that. Now, where in these rules do you find any such proposal?

A. Well, they propose staggered spacing and 80-acre development, don't they?

Q. Well you take the rule here and you point out to me -- here I'll give you the rules and you point out to me in these rules where these rules contain any such proposal, as you say here.

A. It says that in the Commission order itself.

Q. Well, read it. Where?

A. After the effective date of this order, no operator in a new reservoir established as a result of the completion of a wildcat well at a depth range of 10,000 feet or more shall drill more than one well to each 80 acres.

Q. Well, read the next one.

A. That, in itself, answers the question.

Q. Read on.

A. Sure, sure. O.K. The location of the discovery well shall set the pattern for the location of additional wells while the temporary 80-acre proration units are in effect. Subsequent wells drilled to the same reservoir shall be located within 150 feet of the quarter quarter section of identical description to that quarter quarter section in which the discovery well was drilled or within 150 feet of the center of the quarter quarter section diagonal to such quarter quarter section. Each quarter section shall be divided into two proration units running either north and south or east and west.

Q. Now read the third one, please.

A. Unless within not more than 18 months after completion date of the discovery well or within 60 days after completion of the fifth well to the same producing formation within a radius of two miles of such wildcat well, whichever date occurs first, one or more of the operators of said well files an application for a hearing to determine the permanent spading pattern for such reservoir. Such spacing pattern shall revert to 40 acres and upon such hearing, the burden shall be upon such operator or operators to show that one well will efficiently and economically drain 80 acres, failing which, such spacing pattern shall revert to 40 acres.

Q. Now that rule don't assume, as you state here, that one well will always efficiently and economically drain 80 acres, does it?

A. You say you can't drill more than one well to 80 acres.

Q. Well, that rule you just read there, number three, doesn't make any such assumption at all, does it?

MR. HANNERS: If the Commission please, we don't argue that the rule makes the assumption.

JUDGE FOSTER: Very well.

MR. HANNERS: We merely state that the proposed rule is based on a false premise.

Q. That ain't what this report says. You say here, in point number one that the adoption of such a spacing rule for new fields in advance of their discovery necessarily assumes that all fields will be identical and one well will always adequately and efficiently drain 80 acres. That's what you say when you signed it and he says he agrees with it. And I want to know - - -

A. I still think it does. That's what you're after - 80-acre development the same as you were in the Denton field. You wanted 80-acre development there but the Commission found you weren't entitled to it.

Q. Mr. Tesch, let me make this statement for your benefit. I don't know who you mean by "you", but - - -

A. Phillips.

Q. Phillips Petroleum Company and I want to say that that's not what we're after. What we are proposing here in these rules is simply this -

that you wait and let, as you said in your direct testimony, the field stand on its own merits.

A. Yes.

Q. Now, we can't tell in advance whether the spacing should be 80 acres or 40 and that can only be told by actual development. What objection can you find in that?

A. You will force an operator to drill where he might not drill by setting this pattern drilling.

Q. Well you do that on 40-acre drilling.

A. You're always allowed to make a direct off-set.

Q. Isn't it true that you do that on 40-acres?

A. You don't have patterned drilling on 40-acres.

Q. You have uniform pattern on 40 acres in this state, don't you?

A. Yes, sir, but a man's always entitled to make a direct off-set. To this, you say no. You can't make a direct off-set.

Q. Now, that's just for the first five wells, is all. Then it may revert back to 40-acre spacing.

A. From this example that I showed you right there, you can force a man to drill a dry hole.

Q. Well you can do that on 40 acres too.

A. Sure, but he'd at least have a chance for a direct off-set.

Q. Well, it would just get him to a dry hole quicker on 80 than it would on 40, isn't that right? That's all that happends, isn't it?

A. Not necessarily. Because if you drill on 40, you develop a whole lot more information and a whole lot faster to know - to keep away from trouble.

Q. Well, I'm still at a loss to find anywhere in these rules where they assume that each well will efficiently and economically drain 80 acres. Can you show me or point that out to me?

MR. HANNERS: If the Commission, please. We don't own that the proposed rule makes any such assumption. We merely state that if adopted - - -

JUDGE FOSTER: Well, if you adopted it, it would be in there, wouldn't it? If you adopt the rule - - -

MR. HANNERS: It would be making an assumption on the part of the Commission - - -

JUDGE FOSTER: Well, I don't think so and that ain't what you said. Now, here, you say you feel each new field after discovery should be judged on its own particular condition. Isn't that what this rule proposes?

A. Not until 18 months have passed.

Q. Well, now assume you have discovered a new field, how soon would you judge it?

A. Well, it would depend upon its characteristics as you find them.

Q. How are you going to find out the characteristics without drilling?

A. That's exactly what you'll have to do.

Q. Well, now, do you say that there never should be any case where fields shouldn't be developed on 80-acres?

A. No, sir.

Q. Do you admit that there are instances where fields should be developed on 80 acres?

A. Yes, sir.

Q. Doesn't this rule merely implement that?

A. No, sir.

Q. How can you best determine when a field should be or should not be developed on 80 acres?

A. Well, there are - lots of things you need to know.

Q. I know. But what are they?

A. You need to know what kind of a pay section you have, how much you have, what the general structural conditions are. If you need to know how your reservoir fluid acts - many things from an engineering standpoint you need to know to weigh the economics of the proposition.

Q. How best can you determine those factors?

A. By drilling.

Q. Would you suggest to the Commission that you should start out on a 40-acre pattern when the conditions that are developed in the field might indicate that it ought to be on 80?

A. If that is the case. You should ask for a hearing and ask - - and

submit those findings to the Commission and let them pass upon it.

Q. Before you develop the field?

A. No, after you find that out, as you have assumed.

Q. Now, don't you recognize that in New Mexico that you either - - - that you start on 40 to begin with - that you have a state-wide 40 acre rule?

A. That's right.

Q. Now, if you start out on 40 acres and then after you get your reservoir information and find out that it ought to be 80 acres, just how would you then get to 80?

A. You stop drilling. Because no operator is going to drill any wells that he thinks won't bring his money back. Now, I say that as a practical operater, which I am.

Q. That doesn't answer my question. If you start out on 40 acres, and the field information when developed shows that it should have been on 80, how do you then propose to get the 80 acres?

A. You won't.

Q. That's correct. But this rule - - -

A. But you won't get that far if you're a prudent operator.

Q. Just a minute. This rule permits you to start on 80 and then if the operator can't sustain the burden that the rule places on him to show that it ought to go on on 80, it reverts to 40. What objection can you possibly find with that?

A. As I have said before, you can force an operator to drill a dry hole. You don't permit him to drill an off-set well. You force him to stagger. You're assuming from the start that the well will efficiently drain 80 acres.

Q. Well, I don't think the rule assumes that, Bob.

A. Well, I sure interpret it that way.

Q. Well, I don't think the rule assumes that and I don't think the rule is intended to assume that.

A. Well, in that case, you don't need any such rules then. As I see it, I don't see why you need any such rules at all. If you and your

brother operators can't get together between you and work out your own problem. I don't see why you should dump it on the Commission.

Q. Well, isn't that the Commission's function to regulate the operators when they can't agree among themselves?

A. Now, now you're getting somewhere. When they can't agree among themselves. Then you should have a hearing.

Q. Well, if you force an operator to start on 40 acres which you are doing unless you adopt this rule, then it's obvious to everybody that you'll never get to 80 acres in the field and you say that you won't.

A. You can still hold it down to one well to 80 acres, if you want to without forcing a man to drill on a diagonal pattern.

Q. Well, you can't do that, Bob, unless you start out on an 80 acre pattern. You can't get to 80 and stay on 80 unless you start on 80.

A. Sure, but you run into the same thing that you ran into in the Denton field where you drilled on 10 acre location. You were fighting for structure and I don't blame you any. I'd do the same thing myself. But that doesn't mean that you ought to force a man ought on an 80-acre plan.

Q. Well, neither should you force him on a pattern where he can't ever go to 80 if he should?

A. Well, why don't you get together with the operators then. Surely, - - - if you can't get to gether with your brother operators - - off-set operators, you're never going to get together with them at a hearing here.

Q. How do you know that?

(Laughter)

A. I've been in this business a long time, Judge, and I've had a lot of experience with such things.

Q. Now you say here in your thind point against the adoption of this rule that it would go against the expressed wishes of the Legislature. If the Commission were to establish proration units and consider among other things the rights of royalty owners and to reduce recovery and physical waste which might result from the drilling of too few wells and the adoption of the proposed rule in advance of the discovery of the field or

any technical data or knowledge about it would cross the expressed intent of the Legislature. How do you figure that?

A. Well, in my opinion, it could because it's my belief that the more wells you drill, the more oil you will get.

Q. Well, you just don't believe in 80 acre spacing, isn't - - -

A. Oh, yes, sir. I do. Yes, I do, judge. In its proper place. Where you don't have enough recoverable oil to get - - to pay out your well, sure! It all depends upon the particular facts of that particular field which you do not know in advance.

Q. And that's what this rule proposes to do - find out the facts in each particular field - whether you go to 40 or 80. Isn't that fair?

A. I don't think it works that way, Judge.

Q. You don't think it works what way?

A. The way you said.

Q. Well, I can't argue with anybody's inability to read!

A. Well, I can read.

(Laughter)

Q. Now it sets forth here - - - -

A. Well, I don't think that was necessary, Judge. I'm perfectly capable of reading.

Q. Well, I beg your pardon. I get kind of aggravated with you - - - exasperated with you sometimes when you don't answer my questions.

A. I'm answering the questions as I see them, Judge, and I don't think it called for that remark of yours.

Q. Well, suppose I apologize and we'll start all over again.

A. All right. Let's start all over again.

Q. Now this proposed rule is a temporary one. Practical experience in such matters has convinced impartial observers that the actual effect of it would be to shift the burden of proof to the royalty owners and that the rights of royalty owners, including the beneficiaries of our state lands, would be jeopardized. Well, now, you've read those rules and they expressly provide that the burden shall be upon the operator - so your conclusion that it shifts the burden to the royalty owners just can't

stand, can it?

A. I think as a practical matter that in actual effect what will happen - - -

Q. You think the Commission wouldn't follow the rules?

A. No. I didn't say that.

Q. Well, in what way would that happen then - as a practical matter. I just don't understand that!

A. Because, I've seen time and again, when fields after they have been discovered have been developed in a certain length of time and somebody wanted to come in and change the rules, that everybody says you're depriving us of our property. We've gone along on this basis and we don't want to change now. We can't change. And you've seen the same thing happen too. That's a stock answer. When anybody comes up and attempts to change the rules - the plan of development.

Q. I'm not talking about changing the rules. You should direct your remarks with respect to the proposed rule which expressly states that the burden shall be on the operator. Now, your statement just isn't sustained by the language of the rule, is it?

A. Judge, the royalty owner never knows when a field rule is going to be called. He has no notice of such things. It's up to the Commission to look after the royalty owner.

Q. How does this proposed temporary rule jeopardize the interest of the royalty owner?

A. Well, I suppose your Bagley - - not the Bagley but the Crossroads field is a good example. The operators started out on 80-acre spacing and it was fought bitterly by the operators, they didn't want to change to 40 acres. Finally, the Commission saw that 80 acres wasn't wished and changed it back to 40 acres. But that was only after the royalty owners had come in and insisted on it being changed to 40 acres.

Q. Just how could a temporary rule jeopardize the interests of the royalty owners?

A. How would it jeopardize them?

Q. Yes. This is a temporary - - this is not a permanent rule. It

is a proposed temporary rule.

A. Well, I don't look at it as a temporary rule, Judge.

Q. How does that jeopardize the interests of the royalty owners?

A. Because you lay a precedent for keeping on with 80-acre development when it might not be to the interest of the royalty owner.

Q. How do you lay the precedent?

A. You started out on a staggered plan, as recommended.

Q. The burden is still on the operator at the end of five wells, or 18 months, to come in and show whether it ought to continue. How does that jeopardize the interest of the royalty owner?

A. Well, perhaps in the meantime somebody's drilled a dry hole on his particular royalty like happened up there at the Crossroads field.

Q. Well, it don't hurt a royalty owner not to get any oil if there isn't any there, does it?

A. Well, suppose he's got 40 acres that's got some like -- you got 80 acres and 40 of it's dry and 40 of it's good and they drill on the 40 acres that's dry. He sure is hurt all right!

Q. Don't you think in that case that the operator could get an exception?

A. You don't provide for any exception.

Q. I understand that you don't provide for any exception but you know that an exception can be had to any rule.

A. I assume you can.

Q. Yes, sir. Would that take care of that situation?

A. It would. If the operator would do it. There are a lot of individual 40 acre tracts. How are you going to take care of them? I don't see -- this makes no provision for any individual 40-acre tract.

Q. Well, this don't propose to write all the rules on the matter, you understand. The other rules that are in the rule book don't say you couldn't.

A. All right.

Q. Now, you say it would shift the burden of proof to the royalty owner. What do you base that on?

A. Well, of course, that's a legal conclusion. You'll have to ask Mr. Hanners about that.

Q. This is a legal conclusion here. You - - -

A. I didn't write these.

Q. You gave them the dope on it?

A. They wrote it from my report - - from the report I wrote, Judge, in which I stated my conclusions with regard to 80-acre development.

Q. Do you agree with this conclusion as stated here?

A. Well, you'll have to ask Mr. Hanners.

Q. Do you agree with it? That's what I want to know.

A. That's a legal question. I didn't qualify as a lawyer.

Q. Well, you don't know then whether it would shift the burden to the royalty owners or not, do you?

A. I think Mr. Hanners - - - -

Q. I'm asking you. You don't know that, do you?

A. I don't know. I didn't qualify as a - - - -

Q. So you're not in any position to agree with this statement, are you? Since you don't know.

A. Well, I'll tell you. I'll tell you. If you want to, I am a member of the bar in the State of Texas, Judge, and I don't make any pretense of being an able lawyer but I think that that would be what would happen and I think Mr. Hanners would be able to demonstrate that a lot more clearly that I could.

Q. Well, then , you do agree that the proposed rule would shift the burden to the royalty owner?

A. After discussing it with Mr. Hanners, I see no reason why it wouldn't. But he can give you his answers on that, Judge.

Q. Now, tell me, in the rule itself, where do you find anything that would support such a conclusion? Or statement?

A. What statement?

Q. That this rule here would shift the burden to the royalty owner?

A. You ask Mr. Hanners, there.

Q. Well, I'll put him on the stand.

A. All right, sir.

Q. Would you mind telling us, Mr. Hanners?

MR. HANNERS: Be most glad to.

JUDGE FOSTER: All right. Read it into the record here as to how the proposed rule would shift the burden from the operators to the royalty owners.

MR. HANNERS: As a matter of fact, there have appeared before the Commission where the rights of royalty owners are involved depend on two things. Where the royalty owners have come prepared at the expense of technical information to oppose the operators in their plan of operation. Particularly in the Crossroads field where a tremendous amount was spent. The average royalty owner is not in a position to appear at a one-sided hearing. And under the proposed rule, as proposed, when the time comes for the hearing and it says that the burden of proof shall be on you, and you have no opponent, it would be very easy to discharge that burden of proof.

Q. You just don't think the Commission would function properly then?

A. That's right. They would only hear one side of the case. Yours. From the practical standpoint, that's what will happen.

Q. Well, what you're saying then isn't -- there isn't a rule that could be written for the interests of the royalty owners?

A. That's right. Although you have the burden of proof, you can discharge that when you have no opponent.

Q. Well, with the very high regard that I have for you, I just don't agree with what you say.

(Laughter)

Q. You have that same condition whether you have 80-acre spacing or not.

A. I'm not sure that I understand.

Q. He asked me to ask you the question, that is, if the royalty owners interest wouldn't be protected if the hearing were held on the

merits of the field - whether you have 80 acres or 40 acres. It just don't apply to this temporary order - that applies to any hearing.

A. But the temporary order, Judge, prescribes that after 18 months or five wells, you will then have the hearing to consider whether you should go back to 40 acre or remain on the 80. At that time, it is almost certain that when you have the experience behind 5 wells or 18 months - you have the burden of proof that that is the proper spacing plan. You will then have a much easier job of discharging that burden. The royalty owner is ordinarily not able to pay the freight of a contested hearing before the Commission.

Q. Well, that would be true whether you had the temporary rule or not on making application and for that reason, you disagree with 80 acre spacing even though it's a matter of fact that it ought to be 80.

A. I disagree Judge, until the facts show that it should be that. I don't mean to argue with you, Judge.

Q. I understand that. I'm just trying to get your views. As I understand your position and Mr. Tesch too, it seems that you want the royalty owners interest protected - but I think the Commission can protect the interests of everybody. Now, then your fifth point here is that the orderly development of oil fields would be hampered by the adopted of any rule that sanctioned the drilling of fewer wells than reasonably necessary to efficiently and adequately drain and develop the field and the waste of natural resources would thereby occur. Now, how do you apply that statement to the proposed rule?

MR. TESCH: Again I'll have to ask you - - answer youthis way. The general conclusion of mine is that the more wells you drill, the more oil will be recovered.

Q. Well, then, are you advocating that we ought to go off the 40 and go to the 20 or something less than 40?

A. You mean, for these deep fields?

Q. I mean for any field. It doesn't make any difference if it's deep or shallow, does it?

A. Depends on the field itself.

Q. Well, your theory - more wells, more oil - doesn't have any - -

doesn't have any relationship to depth, does it?

A. No, sir.

Q. All right. Now, in New Mexico we have a 40-acre pattern. Are you advocating that we ought to drop the 40 and go to something smaller?

A. No, sir.

Q. Well, on the basis of your statement we're loosing a lot of oil, aren't we? Because we aren't drilling on 20 instead of 40?

A. That again assumes that your economic conditions are such, that the best interests are served by 40-acre development.

Q. Do you think- - - -

A. At the time, if you will recall judge, - at the time that the rules were put in - 1935 - there was considerable opposition to it and that one of the reasons for permitting an operator to drill on a 330 pattern instead of forcing him to drill in the center of these 40-acre units was to allow him that latitude. And an operator can drill below one well in 40 acres if he so desires. Some of them have.

Q. But they don't get any more allowable.

A. No, but that's what you want with this 80-acre. You want to take - you want practically double your allowable - - -

Q. Where do you get that?

A. That's in the rule.

Q. That's not in the rules I have.

A. Oh, yes, sir. Rule 505 provides for it.

Q. That just comes along as a matter of a general state-wide rule on allowables - that they will consider the depth factor.

A. But that's an actuality of what will happen.

Q. Well, don't you think you ought to get an additional allowable on these deep wells?

A. Certainly.

Q. Do you think that this rule - this proposed rule here would hamper the orderly development of the oil fields in the state of New Mexico?

A. I certainly do.

Q. In what way?

A. By the bare fact that you can only drill one well to 80 acres.

You have no option where you're going to drill.

Q. Don't you think that that might promote the development of the oil fields?

A. I certainly don't.

Q. Hm-m-m?

A. I do not.

Q. Well, don't you think that you can determine the limits of an oil field quicker by development on a wider pattern?

A. You may and you may not. With these steep dips up here, you may or you may not. You might do like the Amerada and the Hightower did, drill three dry holes while they were getting three wells.

Q. Now, you make a statement here that 80-acre development would result in less oil being recovered than a closer pattern. Now that can only be true if you assume that one well won't efficiently and adequately drain 80 acres.

A. That's right.

Q. And why do you assume in making that statement to this Commission in opposition to this proposed rule, that one well won't efficiently and adequately drain 80-acres when you don't know anything about - - -

A. That is true. But I am judging that on past experience.

Q. Well, you know, as a matter of fact, that there are fields in this state now where one well will efficiently and economically drain 80 acres, don't you?

A. I do not.

Q. Do you know, as a matter of fact, that the Commission has already granted 80-acre spacing to 4 fields in this state?

A. That is correct. That is one of my conclusions.

Q. And you know that - - -

A. That is the reason that I say it is not necessary to have a rule in advance. The Commission has already recognized where the case - - the facts so warrant that 80 acre is proper.

Q. Well, don't you recognize the fact that the Commission granted those 80 acres spacing rule to the 4 fields in this state on the theory that one well will adequately and efficiently drain 80 acres?

A. I don't think that that is entirely correct, Judge. I think it's a matter of weighing economics against what oil you will get by developing it on that basis. I don't think there was any conclusion that you will get as much oil by drilling on an 80-acre pattern that you get -- as if the fields were developed on a 40-acre pattern.

Q. You don't think that the Commission then on this 80-acre spacing based on the theory that one well in those particular fields perhaps would drain 80 acres?

A. No, sir.

Q. You don't think they did that?

A. No, sir. Not on that fact alone.

Q. Well, I understand. But on that and other facts, they did.

A. Well, chiefly, I presume it was economic factors which influenced the matter.

Q. You make the broad assumption here, in the statement to this Commission, that this proposed rule ought to be denied for the very simple reason that one well won't efficiently and economically drain 80 acres.

A. That's right. --- I didn't say economically. I didn't say economically. I said it wouldn't -- that drilling on 80 acres wouldn't get as much oil out as drilling on 40 acres. Now, I didn't say anything about economics in that case.

Q. Don't you recognize that there is a matter of economics in this oil business?

A. I certainly do. I'd have to - or I'd soon be out of business.

Q. Yes, sir. You wouldn't drill two wells on 80 acres unless you thought the second well would be a paying proposition, would you?

A. No, sir. --- I hope I wouldn't.

Q. Don't you think this Commission ought to consider the economics of this matter in determining what the spacing should be?

A. Yes, sir.

Q. Well, then your statement that 80-acre development will result in less oil being recovered than closer development, doesn't mean very much unless you imply that that's - that there's an economic factor, does it?

A. But it does - it certainly does, Judge. Because you start out with the premise that you are going to get less oil with 80-acre development. Then you have to apply the economic factors to that to see where you stand in regard to that.

Q. Now you know - now you make the statement here that no oil producing state has ever ordered state-wide 80 acre spacing for oil wells.

A. As far as I know, there hasn't been.

Q. Well, that's just as far as you know.

A. If you know of some other, I'd sure like to know about it.

Q. Well, I think before this is over with, we'll give you some.

A. All right, sir. State-wide field - - state-wide 80 acre for oil wells.

Q. This is a temporary matter, at most. - - - -

A. I'm not so sure.

Q. Now, do you think that the Commission here is ordering a state-wide 80-acre spacing rule for oil wells by adopting this temporary order?

A. Yes, sir. For fields below 10,000 feet.

Q. It's only a temporary rule, isn't it?

A. Well, it could or could not be.

Q. Well, I understand. But the order states that it is temporary, isn't it?

A. It's so called but as a practical matter, it isn't.

Q. As a practical matter, you think it's a permanent thing?

A. Yes, sir.

Q. Now, you state down here that the proposed 80-acre rule is only a device to force the Commission to assume responsibility for acts by operators that are contrary to their lease contracts and obligations. Will you explain that to me?

A. Certainly. Every operator has certain obligations to his royalty owners.

Q. Well, now, will you - - -

A. If you just force - - if you come in and drill on 80 acres, then get the Commission to sanction it, they've got to sue the Commission.

Q. How's that?

A. If you drill on 80 acres and then come in and present just your side of the case to them and they sanction it and order 80 acres, then if they do anything about it, they've not only got to sue you but they have to sue the Commission.

Q. Do you think that this Commission would sanction the drilling wells on 80 acres where the facts wouldn't justify it?

A. No, sir. But it could be that they'll only have your facts, Judge.

Q. Well, they're here to judge the facts, ain't they?

A. I think so.

Q. And you make the statement here though that this is just a scheme or device to force the Commission to have the responsibility for the acts of operators.

A. That's what I think.

Q. And you say in another place that royalty owners which includes the public schools, state and federal governments would be in a position of being forced to assume responsibility for the illegal acts of an operator.

A. Yes, sir.

Q. How would an operator be acting illegally if he acted in compliance with the rules.

A. Well, probably the word illegally isn't correct. I'm talking about his obligations to the royalty owners under the - - -

Q. Is this your - - -

A. Yes, but that probably is an unfortunate way to state it. But that is, in general, the conclusion that I - - - - -

Q. What would be illegal about it?

A. As I said, that probably is an unfortunate word. But the obligation of a lessor - or lessee to the lessor to the royalty owners could certainly be circumvented.

Q. Well, now, what word would you substitute for this word "illegal"?

A. Well, let's see. We'd put it "imprudent" acts.

Q. You say then that this is just a device to force the Commission to act "imprudently"?

A. No, sir. I do not. I said it was getting in to take the axe for anything that you might do or not do that you are obligated to do to take care of your royalty owners.

Q. Then you say down here, that there are four fields in New Mexico to which the Commission has granted 80-acre development so that that proves that there is no necessarity for a state-wide rule providing for 80-acre development below 10,000 feet.

A. That's right.

Q. How do you get to that conclusion?

A. It shows right there that the Commission, where the facts warrant, will issue 80-acre development.

Q. Well, - - - -

A. And the operators don't have to come in ahead of time before a field is discovered to get any such rule.

Q. Well, they don't here. You understand that this here just applies to wildcat wells, don't you?

A. It applies to wildcat wells and wells that are drilled after that up to five wells or 18 months.

Q. That's right. One wildcat and four other wells.

A. Or 18 months.

Q. Or 18 months. What is the objection to having a temporary order that will permit an operator and the Commission to know what the reservoir conditions are before you adopt a rule about the pattern?

A. Judge, if I owned an off-set forty acres to the discovery well, I'd sure be pretty unhappy if I couldn't drill a direct off-set to it, or if I owned an 80-acre tract. I would certainly want to be in a position to make a direct off-set to that discovery well.

Q. If there was a provision in this temporary rule for a direct off-set would that cure your objections to this rule?

A. Not necessarily. That's one - - - I still say you have to judge each field on its own particular facts and until you establish those facts, you can't tell whether its - - what you should do.

Q. Well, that's what we attempting to do, to have each field stand on its own legs and then when we have sufficient information, we can

set it at either 40 or 80, isn't that what we're proposing?

A. No, sir. You assume right from the start that a well will drain 80 acres.

Q. Well, we don't assume that it will drain 80 or it will drain 40. We don't make any such - - -

A. Why can't you get together with your other operators then?

Q. And determine in advance whether a well will drain 80 or 40?

A. I'm sure you do it right along - most companies do.

Q. In a new field?

A. Certainly.

Q. I don't know how many do that. But I want to put you straight about what I consider this rule to be. We don't assume that it will drain 80 or that it will drain 40. In fact, the assumption is to the contrary as I understand the rule. All we're asking is an opportunity to find out the actual field condition and then come in and lay these facts before the Commission and let them decide from the reservoir conditions whether one well will drain 80 or it will only drain 40. And if you can find anything else in that rule, I wish you'd point it out to me because if that's in there, I want it corrected.

A. I didn't say that.

Q. What's that?

A. You said that, I didn't say that.

Q. Well, I say, if you can point out anything like that in this rule, by taking the rule and the language of the rule itself, rather than just the expression you're objecting to - - -

A. I don't see any necessity for a rule.

Q. Well, - - -

A. I don't see any necessity for a rule for a field in advance of its discovery.

Q. Don't you see the necessity of having a rule that would hold everything in abeyance until whether you find out whether a well will drain 40 or 80?

A. Not necessarily.

Q. Well, - - -

A. How are you going to hold everything in abeyance. You can't do it, Judge!

Q. Under this rule you do.

A. Well, you'll force everybody else whether they agree with you or not to hold back on 80-acre development.

Q. Well, it would force all the operators on the entire field to do that, wouldn't it? Suppose the operator owns the entire area that is going to be developed. This rule applies to him too.

A. He doesn't need a rule.

Q. No, he doesn't need a - - -

A. Only thing he has to do is fight with himself and decide how he's going to do it.

Q. The only time you need a rule is when you have another operator in the field, isn't it?

A. That's true. Well, if you need a rule.

Q. Well, that's the only time you need a rule when you have more than one operator in the field. You do need a rule then, don't you?

A. You'd need a rule based on the facts of that particular field. Yes, sir.

Q. Yes. You'd need a rule to establish the facts as to what that field is - - -

A. No, sir. I didn't say that. You've already got a rule for the field.

Q. 40 acre.

A. Yes, sir.

Q. You're objection is just going to 80, isn't it? You don't want to go to 80 on any basis.

A. No, sir. It is not. As I have repeatedly said, the facts are the controlling elements on what is proper for it.

Q. Now, will you explain just one thing to this Commission? How can you get to 80-acre spacing in the field if you start with the development of that field on 40?

A. The operators can do it themselves.

Q. But suppose you have one operator who wants to drill on 40 regardless of how much a well will drain and another one that wants to

drill on 80. What are you going to do?

A. I don't think that operator is going to drill on 40 acres unless he thinks he's going to make money out of it, Judge.

Q. Now, but I'm just saying - - - -

A. That's just - - anybody that does, isn't a prudent operator. They might even do as you've done, drill on 10-acre spacing.

Q. But how are you going to get to 80-acre spacing if you start out on 40? If you convince the operators that they ought to start on 40 or force them to start on 40 and not give them a chance to start on 80, how are you ever going to get - - - -

A. You're not. Nobody's being forced to drill on 40 acres. There's nothing in the rules right now that an operator can't drill one well to 80 acres.

Q. There's nothing in the rules either that permits him to make a direct off-set on a 40-acre pattern, is there?

A. That's right. And I don't think any operator should be precluded from making a direct off-set.

Q. I understand that - - -

A. And you wouldn't either if you were in the practical end of the business, either. When it was your own money you were putting out.

Q. Don't you think I've been in this oil business as long as you?

A. I don't think you've been an independent operator like I have, Judge, where you've put out your own money for it.

Q. Whose money do you think these other operators are putting out?

A. I don't know. But you're talking about the operator that wants to drill on 40 acres.

Q. No, I'm not talking about the operator that wants to drill on 40 acres. I'm talking about - - I want you to explain to this Commission how you plan to start on 40 acres in the field - 40 acre pattern in the field and then get to 80.

A. If you can't get together with your brother operators, you never will get to it. That's true.

Q. Well, don't you think - - -

A. I don't see any reason why an operator that thinks he should drill one well to 40 acres should be stopped from doing it. You always have the privilege after the first well is drilled to call a hearing to present the facts to the Commission.

Q. But you might not have enough field information to determine the limits of the field. That's what happened in the Crossroads field, isn't it?

A. To do what?

Q. To have a hearing that is based on one well. You didn't have enough field information to determine whether they ought to have 40. Do you think the Commission would have enough information generally from one well to determine whether it ought to be 40 or 80 acre spacing?

A. Sometimes yes. Most times no.

Q. All right. Then how would you correct that situation?

A. I believe I'd drill some more wells.

Q. All right. And how would you propose to drill these wells to keep them off the 40-acre pattern if you wanted to get to 80?

A. I don't think you should ever prevent an operator from drilling on a 40-acre pattern if he wants to drill on it.

Q. You don't?

A. No, sir.

Q. You just think you should - - -

A. Because he's not going to drill unless he thinks he's going to make some money out of the job and what's good for one is good for the other.

Q. You're just saying that if they can't voluntarily agree, how to develop the field, then they'll just have to settle on 40. Is that right?

A. If somebody is of that opinion. Yes, sir.

Q. That's the way it ought to be?

A. Yes, sir.

Q. You think that 80-acre spacing should be voluntarily agreed upon rather than through orderly process of hearing before the Commission?

A. I certainly do.

JUDGE FOSTER: That's all.

MR. MASON: I'd like to ask a few questions, please. Bob Mason, Cities Service Oil Company.

CROSS EXAMINATION

By MR. MASON:

Q. Mr. Tesch, this proposed rule about which the Judge has just finished examining you deals with two matters instead of one, doesn't it? It deals with the matter of spacing and the matter of well pattern.

A. Yes, sir.

Q. Isn't that correct?

A. Yes, sir.

Q. Are they inextricably bound up with each other, in your opinion?

A. Well, er, to a degree they are. Yes, sir.

Q. Well, they can be separated very well, can't they?

A. Restate that again, Judge. I don't believe I follow you exactly. You're question - - I'm sorry - - I just didn't follow you there.

Q. This committee in its instructions from the Commission had no instructions - - or had no directions to go into the matter of pattern, did they?

A. Well, ah - - - - -

Q. At least, that's what the letter - - - -

MR. HANNERS: We submit that the letter from the Commission is the best evidence.

MR. MASON: I withdraw the question.

Q. Do you think that 80-acre spacing is inextricably bound up with wildcatting?

A. I can see where it couldn't be in some cases, yes, sir.

Q. If you had 80-acre spacing and the matter of wildcatinng was left just as it is now in the State of New Mexico on your 40-acre spacing, I'll ask you, if in your opinion, the matter about which the Judge is concerned with - - that is, the nature of the reservoir - drilling of five wells couldn't be accomplished much more quickly?

A. It would depend upon the particular structural conditions that the operators might anticipate.

Q. How do you reconcile that, Mr. Tesch, with your answer that

the driller of the wildcat well ordinarily just likes to step out a little ways?

A. That's right.

Q. He could do that if well pattern wasn't mentioned in the 80-acres?

A. Yes, sir. Yes, sir.

Q. And what I'm pointing out here or seeking to point out is that if you have 80-acre spacing and you leave the matter of well pattern out, you would have the nature of the reservoir, particularly in the vicinity of the discovery well cleared up much more quickly than you would if the wells had to be stepped out 80 acres.

A. That is probably correct.

Q. Or a half a mile?

A. Yes, sir. That's probably correct.

Q. Yes, sir. Now, you have pointed out that the driller of the discovery well may be required to drill an off-set under this proposed rule to a distance of perhaps a half-mile.

A. Well, I think it figured out nineteen hundred and some feet as I recall that.

Q. Now, with respect to your testimony, you sought to be realistic in saying that most operators would be coming right back to the Commission for exceptions for they would all be unhappy if they drilled a discovery well and then have to step out eighteen hundred and sixty-seven feet or perhaps a half mile.

A. Some of them would. Yes, sir.

Q. That in your opinion would be most of them?

A. Well, it all depends on who they are. Now, I know this to be a fact. That when I was with the Petroleum Administration for War, and we were trying to administer our staggered plan that we were certainly swamped with exceptions by all -- nearly everybody.

Q. And I believe you testified immediately after the POW -- what was that?

A. The Petroleum Administration for War.

Q. Those orders - - yes. After they went out, the operators immediately went back to - - -

A. To their regular, customary drilling.

Q. Yes - as they had done in the past?

A. Yes, sir.

Q. I believe you pointed out, and pointed out rather definitely that the dry hole possibility is increased considerably to the driller of the discovery well in that type of - - -

A. Not the driller of the discovery well.

Q. If he'd have to step out a half mile or - - -

A. Well, any operator. Regardless whether it's the driller or w ho it is. The hazard is increased. Off-set operators.

Q. May I just ask you, I believe you stated to the Judge on cross examination, that you would be very unhappy if you held land adjoining a discovery well and you would be disappointed if you couldn't drill that 40.

A. Yes, sir.

Q. If you were stepping out next to the discovery well on a 40, you'd be very unhappy?

A. Yes ,sir.

Q. If you couldn't drill it?

A. Yes, sir.

JUDGE FOSTER: I didn't ask any such question as that!

MR. MASON: I believe you're right, Judge. I believe he volunteered it.

(Laughter)

Q. This diagonal spacing is entirely theoretical. I believe that's your objection to it, isn't it?

A. Well, that's just one of the objections.

Q. It doesn't take into consideration the structure, at all, does it?

A. No, sir.

Q. And one operator can see down just as far into the ground

as far as the structure is concerned as another.

A. I assume that's right.

Q. You pointed out that you had to find out that you had to find out about structures by drilling.

A. That's right. Of course, you always have a certain amount of geo-physical information available to you - as a general rule, you do. It gives you some idea but not always.

Q. Mr. Tesch, in all fairness, I realize that Cities Service Oil Company occupies a different position from everybody here present. But in all fairness, would you state to the Commission your objections to 80-acre spacing and you've pointed out that there are many fields that should not have been drilled on an 80-acre basis - - -

A. I didn't say many - I said some.

Q. Well, there are some.

A. Yes, sir.

Q. Particularly where you have to drill to 11,000 feet.

A. Yes, sir.

Q. There are considerable economic factors in development.

A. Yes, sir.

Q. I'd like for you to point out your objections to what Cities Service Oil Company advocates here and that is an 80-acre spacing with the option just as you have now in your 40-acre spacing of drilling on the other 80. Now what objection do you have to that?

A. I'm not sure - - that question would around a little bit, Judge.

Q. I think it did too.

(laughter)

A. I'm not trying to evade your question, Judge.

Q. I don't think you were.

A. I just couldn't follow you.

Q. I'm not trying to answer any trick - - - to ask any trick question either. But I'll try to get it out a little more clearly. I'd

like for you to state just what objection you have to 80-acre spacing if what Cities Service advocates - that is, permitting the operators to drill at any location - just as you have it now on your 40-acre spacing on the 80.

A. Well, there are two reasons for that. I don't think that any field rule should be adopted prior to its discovery. Second, I still hold to my contention that you have the basic premise that drilling on 40 acres will result in more oil to be recovered than drilling on 80 acres, therefore, until the economic factors can overcome that, I think that as demonstrated by actual drilling, I don't think that any field rule should be promulgated.

Q. Do you admit that 80-acre spacing of that character would tend to encourage going into these deep fields and developing? More than the 40-acre spacing?

A. I don't know. You've got a lot of fields here being developed on 40 acres. I don't think there's been much discouragement there, Judge.

Q. Well, now, this economic factor is a difficult one and it's and important factor, is it not?

A. Yes, sir. Yes, sir. But there's been one, two, three , four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen fields below 10,000 feet and out of those, there's only been four, so far, that have been found by the Commission - - -

Q. But you're not an expert - - -

A. All I'm saying is that four out of nineteen, thus far, have in the opinion of the Commission been worth drilling on 80 acres, that 80 acres is the proper plan.

Q. Well, now, in your opinion, wouldn't the drilling on 80 acre spacing, with the option to an operator to off-set at any place they choose on the 80 be much preferable to the rule that has been suggested here by - - -

A. If it's a choice of two evils, yes, sir.

Q. I'd like for you to point out the evils.

A. I've already done so. That I don't think a field should have rules promulgated for it until after the facts are there to substantiate it - - - -

Q. Well, that argument of yours that no fields should have rules promulgated for it could be obviously carried until you don't have any spacing can't it? And you are making spacing an instrument of the operator.

A. You always have your basic 40 acres.

Q. Well, you didn't have that until you got it, did you?

A. 1935.

Q. Yes , sir.

A. I was - - -

Q. You can carry your argument until you got down to one acre, then a half acre and then a quarter acre, wouldn't it?

A. Well, no prudent operator is going to do that.

Q. That's right. You've got the economic factor.

A. Yes, sir. Yes, sir.

Q. And if you carry this stepping out 80 acres at a time, that the other side promulgates, if you carry that to its ultimate, why you'd step out and define and delimit your pool much more quickly with 160-acre spacing.

A. That's right.

Q. And you'd delimit it much more quickly - than that - with 320 acre spacing.

A. Y ou'd probably wind up with a lot of dry holes, Judge.

Q. Yes, sir. That's right. So you can sort of run off to a ragged end either way you go, can't you?

A. Yes, sir.

Q. And wouldn't you say that what the Cities Service Oil Company is advocating here is sort of a middle ground between the two extremes?

A. Well, it takes away one of the objections. Yes, sir.

Q. Yes, sir. And isn't it a matter of fact that that's one of the objections as far as the other side is concerned? Now, isn't what Cities Service Oil Company's advocating here exactly what this Commission advocated when they formed this committee?

A. I don't know about that.

Q. There's no mention - - - -

JUDGE FOSTER: I don't believe the record shows what Cities Service has advocated.

MR. MASON: What?

JUDGE FOSTER: I don't think the record yet shows - - -

MR. MASON: I think it does. I t may not show in this particular - - - - - It may not show for the benefit of the new member, but - - - - -

MR. ADAMS: That statement was made in the November hearing, I think.

MR. SPURRIER: Would you be willing to read it into the record?

MR. MASON: Yes, sir.

MR. SPURRIER: We'll recess until 1:30 p.m.

(The meeting recessed until 1:30 p.m.)

MR. SPURRIER: The meeting willcome to order, please.

MR. MASON: Mr. Chairman and members of the Commission, both sides seem to have requested that Cities Service state its position. The Cities Service position has already been stated in the record in November - at the hearing in November, but I will be glad to state it again. I couldn't find anyone on either side who was interested in our position until just a little before noon. Our position is this. We favor the suggested state-wide rule as drawn and submitted by Judge Foster with the following sentence deleted: "Subsequent- - - -

VOICE: What paragraph is that?

MR. MASON: In paragraph 2. "Subsequent wells drilling to the same reservoir shall be located within 150 feet of the center of the quarter quarter section of identical description to that quarter quarter section in which the discovery well was drilled or within 150 feet of the center of a quarter quarter section diagonal to such quarter quarter section." We favor the rule with that sentence deleted. We do, however, favor 150 feet tolerance on account of surface obstructions as regards succeeding wells. Now, does that make our position clear to you?

MR. TESCH: As I understand what you want - you want 80 acre units but you want to be able to drill any place on these 80-acre units. - - -

As I understand your position, you want 80-acre proration units but with its consequent higher allowable but you want to be able to drill anyplace on this 80-acre unit.

Q. That's right. 80-acre units. Well, of course, they want it a temporary rule.

A. Yes, sir.

Q. So that you can go back to 40-acre spacing if the reservoir proves after drilling the 5 wells to be rich enough to justify 40 acres. Is that right?

A. Did you state a question to me?

Q. Yes, sir. I did. I said do you understand our position?

A. Yes, sir. Yes, sir.

Q. You're an operator - - -

A. Yes, sir.

Q. That's exactly the way you'd operate in those areas where you have 80-acre spacing in Texas, isn't it?

A. No, sir. We do not. There are only a very few fields with 80-acre spacing in them.

Q. Well, I'm talking about the fields where there is 80-acre spacing.

A. Now, that, I can't tell you.

Q. I see. I want to clear up one thing for the record here because I may have misunderstood when you testified and the Commission may have. Did you intend to say that you didn't know of any other state that had spacing rules adopted prior to the drilling in the field?

A. I said that I knew of no state that has an 80-acre state-wide rule.

Q. Well, I thought you said you didn't know of any other state besides New Mexico.

A. No, sir. I don't know of any state that has an 80-acre state-wide rule for oil.

Q. But you do know of other states that have 40-acre, don't you?

A. Yes, sir.

Q. Isn't that the rule in Mississippi?

A. Yes, sir.

Q. Is it in Louisiana?

A. I'm not positive about Louisiana. I don't believe that's correct.

Q. They say - - -

A. It's true in Arkansas.

Q. What was that?

A. It's true in Arkansas. As a matter of fact, for a long time in Arkansas the Commission was prohibited from granting anything larger than 40-acre spacing. By statute.

Q. Then you don't know, as a matter of fact, if that is the way that 80-acre spacing, if they have it in Texas, is operated?

A. Well, Judge, there are a few but they are so few and far between that I'm just not familiar with them.

Q. Do you know of any over in Texas where the spacing is diagonal was drilled from the start on diagonal 80-acre diagonal basis?

A. With 80-acre spacing?

Q. Yes.

A. No, sir. It may be, but I don't know of it.

Q. It is true, is it not, that the position of Cities Service Oil Company as stated here allows more elasticity so far as the operators in a given pool for going to either 40 or 80 than either of the plans that have been proposed - - - -

A. Well, sir, we don't want any rule. Now, I think - - I'll say this. I think what you have suggested is an improvement over what Judge Foster has offered.

Q. Are you familiar Weaver-Aldonberger pool in Texas?

A. Very remotely.

Q. You have no production there?

A. No, sir.

MR. MASON: I believe that's all. Oh, I do have one more question.

No, sir. I believe not.

MR. SMITH: May it please the Commission, may I examine the witness?

MR. SPURRIER: Yes, sir. This is not directed at Mr. Smith by any means, but the Commission has directed me to request all counsel to refrain from gett ing into an argument with the witnesses and please confine your arguments to the proper phases of the hearing and if the witness answers a question to the best of his knowledge, let it go at that - rather than try to argue with him, I think it will go more smoothly.

MR. SMITH: My name is J. K. Smith, attorney for Stanolind Oil and Gas Company.

CROSS EXAMINATION

By MR. SMITH:

Q. Mr. Tesch, I'm a little confused. Being a lawyer and not being familiar with some of these things, I hope that you will bear with me on some of the stupid questions I will ask.

(Laughter)

In the first place, do I understand your testimony to be that there is no state rule for 80-acre spacing that you know of?

A. Not for oil.

Q. Are you familiar with the field rules for the Wheeler field in Texas?

A. I said state wide.

Q. Oh, I thought you said state.

A. No, state-wide rules.

Q. No state-wide rules for 80-acres?

A. That's right.

Q. I wanted to make sure that I understood you.

A. Yes, sir. As I said, there are a few.

Q. Now, did I understand you correctly a moment ago to say that you have had no experience with the operation of fields on 80-acre spacing?

A. You mean as an operator?

Q. Well, as an operator - yes.

A. No, sir.

Q. Have you had any experience as a consulting engineer with the operation of 80-acre spacing?

A. Except up here in New Mexico. Yes, sir.

Q. And what fields up here are you familiar with? On 80-acre?

A. Well, the -- principally the Crossroads field is one.

Q. Did you testify as an expert witness in that case?

A. No, sir. But I - - -

Q. Have you made any personal examinations or investigations in that field?

A. I have -- not in the field. I have seen numerous records of the field. I have read all the testimony in the case that - - -

Q. Any testimony then that you have given in the Crossroads field is based upon investigations made by other people or testimony given by other people. Is that right?

A. That is always correct.

Q. So your conclusions should be qualified from the standpoint that you have no personal knowledge of operations under 80-acre spacing.

A. In the Crossroads field? That is correct.

Q. All right. Now, do you have any personal knowledge of the operation of 80-acre spacing elsdwhere in the state of New Mexico?

A. No, sir.

Q. Then your primary premise - may I see those conclusions of his, I haven't seen them yet! Trying to understand your statements in my poor way, your position in this matter - - as I understand it, your primary premise upon which you state that this rule is undesirable is bottomed on the theory that if you have more wells, you get more oil. Is that correct?

A. This is part of it, yes, sir. Also, part of what your own superintendent wrote the Commission about the faulting conditions and the steep dips in these fields which I agree with. That is part of it also.

Q. I beg your pardon. You say my own superintendent?

A. Well, Mr. Pettry wrote the Commission to that effect.

Q. That there are those steeply faulting conditions?

A. The faulted and steep dips of these deep fields in New Mexico.

Q. Have you personally seen the letter?

A. I have a copy of it right here.

Q. May I see it?

A. If I can find it.

Q. Is this the letter?

A. Yes, sir. I want to - -

Q. May I see it?

A. I want to - - read part of it. And I want to get it back!

MR. HANNERS: If the Commission please, we ask that the witness be t reated with fairness. He was asked if he had the letter and the witness has answered that he has.

MR. SMITH: I asked him if I could see it and he said yes.

MR. TESCH: As soon as you get through examining it, let me have it back - there's some parts that I want to read that Mr. Pettry wrote.

Q. Mr. Tesch, I should like to ask that you read the entire letter into the record.

A. I'll let you do that. The part that I'm talking about - - -

Q. I think that the witness should voluntarily read this into the record inasmuch as it's a matter of interpretation and I think orderly proceedings require that he answer my question.

A. All right. I'll read it all to you then. There's part of it, of course - - but you asked for it, I'll read it to you.

Q. You can make your point after you've read it.

A. This was addressed by Mr. Bedford - the letter is dated October 20, 1952 and addressed to Mr. Harry Leonard, Mr. Christie, Mr. McKeller, Mr. Foster, Mr. Hanners and Mr. Danlade, as members of the committee.

"Since you have been appointed as committee by the New Mexico Oil Conservation Commission to advise them on Case 407 pertaining to the adoption of 80-acre spacing, we believe it is appropriate that our thoughts on this matter be conveyed to you, for consideration in preparing recommendations to the Commission.

In general, the Stanolind Oil and Gas Company is very much in favor of the adoption of a rule of this type. We agree that it is a desirable,

progressive step which will result in the prevention of waste by eliminating the drilling of unnecessary wells. It will encourage deeper exploration and by more quickly defining sub-surface structure, such a rule will enable the operators to obtain more conclusive data on which to establish a more suitable spacing pattern. In order to make this rule more effective, however, we recommend that consideration be given to the following additional points:

1. The rule should remain in effect until five wells have been completed. A hearing should then be held to determine the final spacing pattern, and this rule should continue in effect until a formal order has been issued. This procedure should enable an operator to acquire the minimum necessary data to support an application for an appropriate field rule. Since the development of deeper origins which proceeds at a relatively slow rate, we do not believe the time limit should be placed upon this rule limiting the period of time during which the origin effected might preclude the acquisition of sufficient reservoir data to determine the optimum spacing pattern.

Now, this is the part that I referred to, Mr. Smith. I would like to - - - -

2. This rule should apply to any newly discovered origin in which all or any part of the producing interval is encountered below 10,000 feet. It is virtually impossible, on initial drilling, to determine the relative position of a well on a sub-surface structure. And we believe that such a provision is necessary to give the rule desired flexibility since our experience has indicated that many deep structures have steeply dipping flanks with relatively high closure and they reveal complex faulting.

That is the part that I had reference to - - -

MR. MASON: I don't know whether it's proper at this time but Cities Service would like to have that exhibit marked as Cities Service Oil Company exhibit.

(Laughter)

MR. TESCH: Well, you claim it - I don't claim it, Judge. It's all right with me.

Paragraph 3. Provision should be made in the rule for controlling the location of the first five wells drilled in order to assure uniform and

and orderly development to an 80-acre proration unit if they should eventually be adopted in the field on a permanent basis. For the five initial wells, this should require development of an alternate 40-acre spacing plan -- pattern. Depending upon the outcome of the hearing, then it would be a simple matter to continue on uniform 80-acre spacing or drill the necessary wells to increase the density to 40-acre spacing proration units.

Yours very truly, C. E. Bedford.

Q. Am I correct in that you disagree with this letter.

A. Well, from an engineering and geological standpoint, I concurred with Mr. Bedford that that is the case up here in regard to steeply dipping flanks of these structures and complex faulting.

Q. Well, I - - -

A. That is one of the rules -- one of the reasons that I stated before in which your company apparently concurs.

Q. Now, let me ask you this question to get your position firmly delineated. I understand then that you have two points in support of your proposition - one, steeply dipping structures and the other, the more wells, the more oil. Now do you have any other reason? To support your refusal to - - - -

A. Certainly. I don't think any field should be judged before it's discovered.

Q. Then, I understand your position to be that the Commission should eliminate the present 40-acre rule?

A. No, I didn't say that.

Q. Well, isn't that a state-wide rule?

A. Yes, sir.

Q. Doesn't it have application for discovery wells and other wells before they are developed? Before any field is developed?

A. Certainly. But that was put in in 1935.

Q. Well, apparently, I guess I'm confused, Mr. Tesch because I understood youto say - - - that you objected to any rules with respect to the judging of any field before it is discovered.

A. That is correct. And that's what you're asking here.

Q. Now, to go into that proposition just a little. That statement of yours, of course, is not bottomed on any specific practical data, I presume - - -

A. What statement?

Q. Well, the statement that you don't think they ought to have any rules for the - - -

A. Let me tell you something. I have been in this business 19 years - since I got out of college. I've been in the proration angle for your company and I know how your company works in those respects as well as a lot of the others. You have no more intention of going back to 40-acres than flying over the moon.

Q. I'd like to ask the Commission disregard the last statement on the part of the witness as being based on pure surmise, without any knowledge of what he's talking about.

(Laughter)

A. Don't forget that I was with the company before you were. I worked for them for a long time. - - Your own company.

MR. SPURRIER: Without objection, the letter which was just read will be received as an exhibit. Mr. Smith, you may proceed.

Q. Now, with respect to your statement on sharply dipping structures which I assume can be recognized as being a geological fact, I want to ask you if you do not think that aside from the question of expediency, that the Commission by proper exception which it has under its rules, could in any case where a particular operator was fearful that he was on a narrow steeply dipping structure, make an exception, whereby he could drill his well closer.

A. I assume they could. However, your committee in this proposed - - - have provided for no exception.

Q. Well, doesn't that provided for in the state-wide rules?

A. You are probably more familiar with that than I am. I don't know.

Q. Well, I didn't know. I thought I'd inquire. Passing from that proposition of the steeply dipping structure, on this statement - more

wells, more oil. You have testified that you are not familiar with the operation on 80-acre spacing, so I assume that you are not really in a position to want to qualify your statements.

A. Well, there have been so very few fields developed on 80-acre spacing. There is very little history available, Mr. Smith.

Q. You are not in a position to testify on the amount of recovery that could be expected on 80-acre spacing as against 40?

A. No, sir. No, sir. It will be more.

Q. Would you like the Commission to disregard your testimony then when it comes to the question of comparing the two?

A. How can you compare something in advance?

Q. Well, after it has been developed - are you familiar with its operation?

A. I have a rough idea - - but to tell you exactly how many more barrels you would recover, I can't do neither can any other engineer. But we do know from practical experience that you will recover more oil.

Q. Well, that's a relative term, isn't it?

A. Well, a very interesting report came out from the Bureau of Mines, just in February up at the old Healton field where they had a lot of history. There's been a lot of in-fill drilling. They showed very conclusively that - - and they so reported - - that a lot more oil has been recovered by in-fill drilling, closer spacing.

Q. Do you have that report with you?

A. Yes, sir.

Q. I note that the petroleum engineering study of the Healton Oil Field, Quarter County, Oklahoma.

A. Yes, sir.

Q. Are its findings restricted to that particular field?

A. Yes, sir.

Q. Isn't it true that that particular field has a very lenticular structure?

A. Lenticular?

Q. That's right.

A. Not lenticular structure - no, sir.

Q. Well, I mean, isn't the structure then lenticular?

A. The what?

Q. The structure itself lenticular?

A. No, sir.

Q. The interference in the structure itself?

A. There are a number of pays in the field, yes, sir.

Q. I'm not familiar with this report so I'll have to ask you a few more stupid questions. In the first place in this particular field, are you familiar from reading this report or from personal observation the type of structure from which it was produced.

A. Only from the report says.

Q. Does the report make any reference to the fact that there is some lenticular development within the structure?

A. I don't recall.

Q. You don't recall it's being there?

A. No, I was particularly interested in their conclusions with regard to in-fill drilling there.

Q. Of course, if you have interference within the structure so that the wells are completed at different locations, they might not have positive communication - back and forth - then of course, the same conclusion wouldn't be true with respect to other fields where you do have communication. Isn't that correct?

A. That would be correct.

Q. So that if this report does reflect that that condition does exist - that there is interference or lack of communication from one well to another or imperfect communication, then it would be an isolated instance compared to the great number of fields with which you are personally acquainted.

A. Well, I don't recall anything in there that - - this study was confined to individual leases where there apparently was continuous sand throughout the area that they were investigating.

Q. You just don't recall that?

A. Not exactly.

Q. Well - - - -

A. You can read that part in there about in-fill drilling.

Q. What is the spacing pattern in that field?

A. Oh, I think they started out - - it was very close spacing and they drilled in some instances at 4 to 5 acres and then they drilled it down to maybe 1 to 2 acres and then 1 acre.

Q. You aren't recommending that type of spacing for New Mexico, are you?

A. No. I can well remember though a couple of examples on your own properties - Stanolind properties - I remember in 1935 when I was a field engineer for Stanolind in the King field. I remember Stanolind started to drill their inside locations. All the rest of the oils were pumping - pumping at capacity and we drilled inside that lease - the old Bowleson lease and got flowing wells that flowed for awhile. If you'll check your records on your T88-N and N lease in the north end of the Ender field, you'll find a very concise record of a well, which you call, T88-N3.

Q. Well, Mr. Tesch, I didn't understand that we were on trial.

A. I'm just reminding you.

Q. I understand, of course, that each field represents an individual problem and you can have a situation where that might occur but it may be isolated. Now, getting down to your general statement about more wells, more oil, I assume that you mean for instance that if you have 40-acre spacing and go to 20-acre spacing, you'll get twice as much oil.

A. I didn't say that.

Q. Well, I'd like to know just exactly - - -

A. I don't know how much you will get. You'll just get more oil.

Q. Are you familiar with the Inter-State Oil Compact Report on well spacing?

A. Briefly. Briefly.

Q. Have you read it?

A. Parts of it.

Q. Which parts did you read?

A. I don't recall. I know that there was a very interesting discussion by Mr. Tomlinson of Oklahoma in regard to oil spacing.

Q. That's right. Did you read Mr. Cantalier's statement with regard to oil spacing?

A. Well, you know, I never did read anything by Cantalier because I don't believe much in what he has to say.

(Laughter)

Q. Did you read the article by Grayson?

A. No, sir.

Q. Did you read Mr. Crays statement?

A. No, sir.

Q. Or Mr. Buckley's statement?

A. Who?

Q. Mr. Buckley. As I recall it, I think - - -

A. Yes, I think I read Buckley's statement. As I recall it.

Q. As I recall it, according to the report here, there were some nine people's studies investigated and the Oil Compact got out a report more or less summarizing and stating what they had to say about it. I assume that you will admit that possibly Barton and Crays and Buckley are of equal authority with Tomlinson.

A. I don't think they are.

Q. That's just your own personal - - -

A. I'll tell you, Mr. Tomlinson has made a fortune by in-fill drilling 'cause he believes in close - - the more wells, the more oil and he's made a fortune by doing that. Now, none of these other gentlemen have done that. It's only theory with them. He's made money on it.

Q. All right. Now, let me ask you also if you are familiar with the report of Keller and Calaway on the Critical Analysis of the Effect of Oil Density on Recovery Efficiency?

A. Yes, sir.

Q. You've read that report, I presume?

A. I have read that.

Q. And you are familiar with the table that they have worked out upon the relative percent of oil recovered under their theoretical conditions.

A. It's been some time since I read it. I remember something about that table but I don't recall - - -

Q. Does this refresh your recollection somewhat? Is that it?

A. It seems to me that they had a curve. I don't remember this. I think they had a curve showing how much more oil could be recovered by closer spacing.

Q. Well, let me ask you to read a little bit further here and see if it does refresh your recollection.

A. I don't believe it would. Why don't you read it into the record. That's part of your exhibit.

Q. Well, I'd like to know just how much - - -

A. I told you it's been several years since I read that. I just don't remember all those details of the report.

Q. Several years? This report is dated September 10, 1951. You must have read it right after it came out. You say that you are not familiar with it. Now, I'll ask you if the statements in this report on oil spacing by the Inter-State Oil Compact Commission which has this statement - - quoting from this report of Keller and Calaway: The average permeability of 15 millidarcys , spacing acres per well, 160, percent of original oil recovered 16.45. For 80 acres, the percent of original oil recovered 16.52, for 40 acres, the percent of original oil recovered is 16.60.

MR. MASON: May I interrupt right here. What are you reading?

MR. SMITH: I'm reading from Keller and Calaway's report as reported in this document here.

MR. MASON: Does it show on what field this was made?

MR. SMITH: If you'd like this to go into evidence, I would be glad to have it go in.

MR. TESCH: Why don't you bring Mr. Keller and Mr. Calaway here so that we can talk to them?

MR. SMITH: Would you like to have it go in? I'd like to ask Mr. Tesch if he's in agreement with respect to the theoretical conclusions which were just now stated?

A. I don't know what they are.

Q. Have you made any personal investigation of the percentage of recovery of oil - the differential between 80 and 40 acres? To go on a permanent spacing pattern to that effect?

A. Nobody can.

Q. Well, you just stated that you are familiar with the fact that Keller and Calaway have made such an analysis.

A. They made a report, yes. But that doesn't mean that it's correct. I don't know whether it's correct or not.

Q. Your position, as I understand it is, that you just don't know. You're not in a position to challenge it and you're not in a position to testify to the contrary.

A. I've seen a whole lot of oil fields, Mr. Smith. I've seen a lot of operations and I have observed things personally and that's principally what I base my conclusions on. Just like on your own properties.

Q. Mr. Tesch, I would prefer for you to use some other illustration.

(Laughter)

You do know of some others, don't you? Other than those that you have worked in?

A. Of course, those are very pertinent to me.

Q. In the first place, you haven't identified the specific reasons.

A. Sure, I have. The first instance that I was talking about was your Bolesen lease in the King field. The second instance was in the north end of the Hendricks field.

MR. SMITH: May it please the Commission, I'd like to ask at this time that the matter be continued so that we can get these people here that it has been suggested that we bring here for the edification of the Commission. I think we can get Mr. Buckley and get certain people up here who are recognized authorities on the subject.

MR. HINKLE: Members of the Commission. My name is Clarence Hinkle representing the Humble Oil and Refining Company. I would like to join in the request made by Mr. Smith that this hearing be continued in behalf of the Humble. I think there are a lot of other members of the industry here that feel the same way we do that this report came as a complete surprise. We didn't think it was due before the committee because we couldn't get together. There has been this report submitted here and in fairness to the other members of the committee, they should be given an opportunity to file their report and I think we should be given time to go into the matters a little further.

JUDGE FOSTER: Mr. Chairman.

MR. SPURRIER: Judge Foster.

JUDGE FOSTER: E. H. Foster, representing Phillips Petroleum Company. I would like to join with Humble in their request and I would further like to point out that we had no way of knowing in advance that this hearing would be extended to matters not included in the original call. And we came here prepared of course, to present our testimony upon the proposed temporary 80-acre spacing rule not whether we ought to have 80 instead of 40 and to let the matter go as far as it has. We stated our objection this morning on it and we feel we are entitled to bring in experts to go over the whole matter. We feel we should be permitted to bring them. We can bring them and we will bring them if we had known that this hearing was going to take the turn that it did here this morning. We ask this Commission and we urge it again to confine it to the issues that were made by the call but for the benefit of State Land Commissioner, and very properly so, you have extended the scope of it and leave us here without any witnesses, to meet some of these mere conclusions that have been put into this record. We feel that we ought to have the opportunity to meet those.

MR. SPURRIER: Do I understand that you don't have any witnesses, Judge?

JUDGE FOSTER: I have one witness in this but I don't have anybody here to testify on the relative merits of 40 versus 80-acre spacing and that's what this hearing seems to have gotten down to. And had I known that you were going to go into this question, as I told you this morning, we could have had some witnesses here. But I assumed that we would stay within the call. But I don't believe we have. I think if you gentlemen want to be enlightened about

it, we would be very glad to do it. If you want to kick the thing wide open, we're willing to bring the witnesses here. Just give us thirty days and we'll be here.

MR. MASON: Bob Mason, Cities Service Oil Company.

MR. SPURRIER: I don't believe you're getting into the record.

MR. MASON: I'd like to join with Judge Foster in asking that the matter be continued. We are very anxious to have them put on their evidence with reference to the 80-acre spacing, and we feel they should be given that opportunity.

MR. HANNERS: G. T. Hanners, one of the members of the Committee. We have understood that the matter today - - - our objection is that we should not adopt any rule in advance of information on the whole. That has been the basis of our presentation. We have put on all the testimony we have showing the fallacy of adopting a rule in advance. We have assumed that Judge Foster would have testimony ready here to support it. Whatever is the pleasure of the Commission, we will abide by it. I would merely like to state that if the hearing is continued, Mr. Tesch's prior committments are such that we would like for it to be continued for sixty days rather than at the next regular session.

MR. SPURRIER: Now, Mr. Smith. Do we understand your original motion for continuance?

MR. SMITH: That is correct.

MR. SPURRIER: To June 16th?

MR. SMITH: Whatever the Commission desires, will be satisfactory to us.

MR. SPURRIER: I stand corrected. I don't believe you asked for sixty days, it was Mr. Hanners.

MR. HANNERS: We will meet the Commission's pleasure in the matter. We would like to inquire, however, if Phillips will give their testimony today?

MR. SPURRIER: We will ask Judge Foster about that.

JUDGE FOSTER: We'd be happy to. We'd be happy to. Our testimony however, will be confined within the limits of the call.

MR. SPURRIER: Isn't it true, Judge, that if he testifies today, you will probably call him back later?

JUDGE FOSTER: I don't see anything to be gained by it but if it is the wish of the Commission, all right.

MR. HANNERS: I'd just like to ask your indulgence and ask the Commission to let him testify so that I might ask him a few questions just in case Mr. Tesch is not able to get back.

MR. TESCH: I've got some committments and they are uncertain and if anybody has any questions, I would prefer that they do it now because I may not be able to get back here.

MR. MASON: This has been made more important by the statement of counsel here at this time. I have a question I'd like to ask.

MR. SPURRIER: Very well, you may proceed. And if anyone else has a question of this witness - - Mr. Smith I don't know if you were through or whether you - - -

MR. MASON: There's one question. That's all I have. I'm Bob Mason for Cities Service Oil Company, Bartlesville, Oklahoma. Oh, I'm sorry - - -

MR. SMITH: That's all right. Go right ahead.

CROSS EXAMINATION

By: MR. MASON:

Q. Mr. Tesch, I understood you to day that you didn't favor any future statement before information was available in connection with a given field or pool. Is that correct?

A. Yes, sir. That is essentially my thought.

Q. Does this mean that you are opposed to the present 40-acre spacing rule?

A. No, sir. It's been in so long that you can't change that.

Q. Well, then logically, you'd then have to be opposed to that, w ouldn't you?

A. I'm not here to upset or try to change something that has been in effect for a good many years. But basically I think and it's my position that there's no collateral attack on my part on any of these - - what's going on.

Q. Yes, sir.

A. It's my own personal convictions that any field should not have its rules promulgated until after sufficient evidence is available to determine what is - - what are the proper rules.

Q. Well, then you're against any future stating of rules whether it's 40 acres which is in force in New Mexico now or whatever pattern or - - -

A. No, I'm not. If the facts warrant it I'm for it. But I think every field should stand on its own merits. That's my - - -

Q. The facts don't warrant it if you don't have any facts on the pool, does it?

A. That's right.

Q. So that - - now your counsel has said the same thing that he is opposed to any future spacing of a pool - - -

MR. HANNERS: That is not correct. I wish to reiterate so that the record may be straight. The witness now on the stand makes no attack on our present 40-acre state-wide spacing rule. The committee members make no attack on it. Our only objection is the adoption in advance of any departure from our 40-acre normal state-wide rule.

Q. Well, then, if that's your position then it's just a difference between 40 and 80, isn't it?

MR. HANNERS: No, it is not. 80-acre would be an exception to the normal state-wide 40-acre pattern and we oppose any exception in advance that is not based on any knowledge to support it.

Q. Well, then, you're not opposed to the future spacing of a pool that's never been drilled, as you stated you were awhile ago.

MR. HANNERS: I - - -

Q. You stated to the Commission here a little while ago that you were opposed to the future spacing of a pool, one that hasn't been drilled, that you were opposed to that - - -

MR. HANNERS: No, we are opposed to any exception to the normal state-wide 40-acre pattern on any pool prior to its discovery.

Q. Then you are in favor of the 40-acre spacing rule?

MR. HANNERS: Wholeheartedly.

Q. That clears it up. I believe that that does it.

MR. SPURRIER: Mr. Smith?

MR. SMITH: I believe that the question I wanted to arrive at was ably covered by Mr. Mason.

MR. SPURRIER: Does anyone else have a question of this witness? Before I ask that question, maybe I should say that the Commission will continue the case until June 16th to give you the opportunity to bring the witnesses you would care to bring.

MR. HANNERS: May I ask, will the witness for the proponents of the rule be allowed to testify today?

MR. SPURRIER: Judge Foster, will you have your witness take the stand, please? We'll take a five minute recess.

(Five minute recess)

EDWARD N. WASHBURN

having first been duly sworn, testified as follows:

DIRECT EXAMINATION

By JUDGE FOSTER:

Q. What is your name?

A. Edward N. Washburn.

Q. Where do you reside, Mr. Washburn?

A. Bartlesville, Oklahoma.

Q. You're a graduate engineer from the University of Oklahoma?

A. That's right.

Q. Do you hold a degree?

A. Yes, sir.

Q. And when did you graduate?

A. 1934.

Q. And since then, by whom have you been employed?

A. Phillips Petroleum Company.

Q. And in the capacity of an engineer?

A. That's right.

Q. And during the course of your 19 years of employment, have you had occasion to study the matter of well spacing and related problems?

A. Yes, sir.

Q. Have you ever testified before the Commission before?

A. Not before the New Mexico - no, sir.

Q. I believe you're qualified. Mr. Washburn, are you familiar with the rules which have been proposed here for a temporary 80-acre - - for the establishment of a temporary 80-acre proration unit?

A. Yes, sir.

Q. I'd like to get the record straight. Do you make any distinction between the term well spacing and the establishment of proration units?

A. No, sir.

Q. Have you examined these rules that have been proposed?

A. That's right.

Q. Now can you tell us any good reason why these rules shouldn't be adopted?

A. The rules will permit a temporary 80-acre spacing until information can be obtained or assembled at an early date to permit the study of the field and a decision made as to what type of spacing is best for that particular field.

Q. Do you think that's a desirable way to proceed in the orderly development of oil fields?

A. Yes, sir.

Q. Do you find anything in the rules, Mr. Washburn, that you consider to be unfair to any operator or any producer or to the State of New Mexico or to a royalty owner?

A. None.

Q. Sir?

A. None.

Q. Would you state to the Commission what the advantages would be in starting on an 80-acre temporary basis over the present 40-acre basis which is now in existence in the State of New Mexico?

A. It has been - - four examples where 80-acre spacing was proven to the Commission was the most desirable spacing. If a field initially starts on 40-acres, it's very nearly impossible to get a pattern 80-acre spacing at a later date.

Q. And it's true, is it not, that if you continue to drill on

in this State on 40-acre that if an when you do discover an oil pool, that would be adaptable to 80-acre spacing, that it would be almost impossible to take advantage of 80-acre spacing?

A. That is right.

Q. That's true?

A. Yes, sir.

Q. Now, can you find any objection - any valid objection why the Commission should not issue a temporary 80-acre rule?

A. No, sir.

Q. On the other hand, there are those valid reasons which you stated why the Commission should do such a thing?

A. That's right.

Q. Now, do you find anything in the proposed rules that would permanently fix the development of an oil field on an 80-acre pattern?

A. No. That will be decided after the fifth well - what pattern is to be used. This merely leaves it open as to what pattern will be most efficient.

Q. And do you think that at the end of drilling of the five wells or at the end of 18 months, whichever occurs first, that ordinarily an operator or operators in the pool would have sufficient information to come in before the Commission and show whether the field will adequately drain 80 or should go back to 40?

A. Yes, sir. By that time, they should know what type of reservoir they've got, have it fairly well outlined and be able to present their information to the Commission, - - either supporting or returning to 80-acre spacing - - - ah, 40-acre spacing.

Q. Now, starting a new pool on temporary 80-acre spacing, will that more readily give you the information with respect to reservoir conditions than starting on a permanent 40-acre basis?

A. By diagonal off-setting on 80-acre spacing, they would cover the area - - the field could be defined at a quicker date, than they could at 40.

Q. Than they could at 40?

A. With a - - -

Q. Do you regard that as an advantage or a disadvantage?

A. It would be a definite advantage. It would be early information needed by the Commission to make these decisions.

Q. Would you regard that in any way injurious or detrimental to the interest of the State of New Mexico which might happen to be the royalty owner under some of these fields?

A. No.

Q. Would you regard it as any way detrimental or not beneficial to any other royalty owner in the pool?

A. No, sir.

Q. Now you don't take any position on these proposed rules as to whether a field should or should not be developed on 40-acres or 80-acres, do you?

A. No, sir.

Q. Is it your position that in order to determine whether a field should be developed on 40-acre or 80-acres, that it would be a wise policy to first find out what the nature of the reservoir is?

A. That's right. I believe that's the purpose of the rule.

Q. You believe that's the purpose of the rule?

A. Yes, sir.

Q. Now, I call your attention to the fact, whether you know it or not, that in this State the Commission has already established 80-acre proration units in four fields. Now would you regard the proposal here of adopting this 80-acre - - temporary 80-acre order as a means of implementing the Commission's policies, which is already evidenced, by the establishment of the 80-acre field?

A. Yes, sir.

Q. And that's about all that it really amounts to at this time, is it not?

A. That's the way I see it, yes, sir.

Q. Is it your position that in a given oil pool that you should establish the widest spacing pattern or establish the largest proration unit

that can be efficiently and economically drained by one well?

A. Yes, sir.

Q. And if it can be efficiently and economically -- one well won't efficiently and economically drain the 80-acres, then obviously the field should be developed on a smaller pattern, should it not?

A. That's correct. Yes, sir.

Q. By what other means, other than drilling that field and taking core analysis and analyzing them and the other data that you get from drilling is there to guide an operator or a Commission such as this in determining what the proration unit should be. What other information is there?

A. The only way to get that information is to drill wells.

Q. Drill wells?

A. Yes, sir.

Q. Now, I'll ask you if the establishment of a temporary 80-acre order here establishing a temporary 80-acre proration unit, I'll ask you if that wouldn't more readily keep out the wells in the area where you apply?

A. That's true. Yes, sir.

Q. Now, there's been some contention here today that it might cause somebody to drill a dry hole. Now, that's true, isn't it?

A. Yes, sir.

Q. But the effect of that is that he'll just hit the dry hole quicker than he would on a smaller pattern. Isn't that true?

A. Yes, sir.

Q. Is it your idea, Mr. Washburn, that in the case of an isolated 40 that the Commission would very well grant an exception in that instance, if they had a case like that presented to them?

A. Yes, sir.

Q. It would be an anomalous situation wouldn't it where a man had 40 acres and couldn't drill a well? You don't think the rule would propose that, do you?

A. No.

Q. As a matter of fact, they don't propose any such thing, do

they?

A. No.

Q. Now, you realize, of course, that the State of New Mexico is a large royalty owner under a lot of state-owned land in this state, do you not?

A. Yes, sir.

Q. Do you feel that with the provision in this rule - the expressed provision in here to the effect that the burden of proof is upon the operator in the field to establish whether they should have permanent 80-acre proration units in that field, or not, adequately protects the interests of the royalty owner?

A. Yes, sir.

Q. Do you think it does?

A. Yes, sir.

Q. And, of course, you realize that the State of New Mexico as a royalty owner, is represented by the State Land Commissioner on this Commission, do you not?

A. Yes, sir.

Q. And it's obvious, isn't it, as far as the state is concerned, that there is one member of this Commission to look after it's interests as a royalty owner?

A. Yes, sir.

MR. MASON: I would like to suggest that there are three members on the Commission who are looking after the State's interest.

(Laughter)

Q. Do you have any information on the drilling of dry holes in this State during the last year?

A. Yes, sir. Some statistics from the trade journals. Merely to indicate how the drilling is in New Mexico. Of wildcats drilled in 1952 in New Mexico, 48 oil wells were successful wildcats and they had an average depth of 7,230 feet. There was 152 dry holes drilled in 1952 at an average depth of 5,120 feet. In other words, the successful wildcats were about almost 2,000 feet deeper than the average dry hole that was - - - -

Q. What does that indicate to you?

A. That deeper drilling is going to be required to bring up the reserves of the State.

Q. To bring up the oil reserves of this State. How many wildcat wells did they drill in this state, last year?

A. The Oil and Gas Journal - my information is from the 3 and 30 Oil and Gas Journal of this year, page 141. They list 170.

Q. How many of those were dry holes?

A. 152.

Q. Percentage wise, how many is that?

A. It's about 3/4 - - three dry holes to each successful well. Correct - three dry holes to each successful producer.

Q. Three out of four of those wells drilled were wildcat wells?

A. That's right.

Q. Is that right?

A. Yes, sir.

Q. Now do you think that the adoption of this proposed temporary 80-acre order might encourage wildcating?

A. Yes, sir.

Q. Is there any other way to build up the oil reserves in this State except through wildcating?

A. That's the only way I know.

Q. That's the only way you can do it, isn't it?

A. Yes, sir.

Q. Do you recommend it as a matter of policy to this Commission that they adopt the rule that would encourage wildcating?

A. Yes, sir.

JUDGE FOSTER: I believe that's all.

CROSS EXAMINATION

By MR. HANNEKS:

Q. Mr. Washburn, from the drilling of a wildcat well, you are generally unable to determine its relative position on the structure, isn't

that correct?

A. Usually, yes, sir.

Q. Ordinarily where would a prudent operator want to drill the second well to test where it and the first one were on the structure? Would he want to drill a direct off-set?

A. Not necessarily.

Q. Why would he not?

A. If he had the possibility of returning to 40-acres at a later date, he could drill on 80-acres and prove his structure much faster.

Q. Isn't it true, ordinarily, Mr. Washburn, that from the first well a reasonably prudent operator would prefer to drill a direct off-set so that he would know whether he was still on the structure? Isn't that generally true?

A. That is true because of the 40-acre spacing more or less in effect right now.

Q. Speaking of the dry holes that have been drilled in New Mexico from the Oil and Gas Journal, did it also show the national average?

A. Yes, sir. It did.

Q. What was that national average?

A. The national average oil -- successful oil wells -- do you want the depths - is that what you're interested in?

Q. I want the percentages - you said three out of four.

A. I don't have it divided into percentages, I believe that the percentage is about 80 percent.

Q. Was the percentage for New Mexico better than the national average?

A. Slightly higher.

Q. By slightly higher, do you mean the percentage in New Mexico or the national average -- higher than the national average?

A. Yes, sir. At a much shallower depth.

Q. Now, of the 19 fields that we have in New Mexico, below 10,000 feet, four of them, I believe, are on 80-acre spacing pattern and 15 on the

40-acre pattern?

A. I believe that's right. Yes, sir.

Q. So that about 75 percent of our fields are on the 40-acre spacing pattern. Isn't that true?

A. About. Yes, sir.

Q. I believe you said that the purpose of the proposed rule is looking toward the establishment of 80-acre proration units.

A. It's looking forward to see what is the most efficient unit.

Q. When Judge Foster asked you if it would implement some statement he made, he asked you if it was looking toward the establishment of 80-acre proration units. Is that the purpose of the rule?

A. State that again please?

Q. Is the purpose of the rule to eventually establish 80-acre proration units?

A. No, sir.

Q. Is it looking toward the establishment of proration units of 80 acres?

A. It's not -- it's looking toward the possibility.

Q. Now, a proration unit as defined by law is the area that can be efficiently and economically drained and developed by one well. So if you adopt a rule looking toward the establishment of 80-acre proration units, you necessarily assume that an 80-acre pattern will economically and efficiently drain and develop one well.

A. You don't decide that until you have the information to determine it.

Q. But the adoption of the rule looking toward the establishment of 80-acre proration units necessarily assumes that an 80-acre unit can be efficiently and economically drained and developed by one well.

A. I can't answer that because it's implying things.

Q. The rule implies and the facts will support an 80-acre permanent proration unit.

JUDGE FOSTER: The rules speak for themselves. Here's the rules. I submit that the rules answer that.

Q. A proration unit on a - - - I'll rephrase the question. I want to get this one question and then I'll be through with you. If the purpose of the rules is looking toward the establishment of 80-acre proration units, isn't it necessarily based on the premise that geological facts when developed will show that one well will efficiently and economically drain and develop it?

A. That will have to be - - I can't - - that's implying that we want 80-acre spacing and we do not. We want to define the information as quick as possible to decide what kind of spacing is needed.

Q. What is there to prevent you and your associate company from following the 80-acre proration on your own when you discover the first well? Why do you need this rule?

A. We could, ourselves, I assume, have a special hearing.

Q. And if - - -

A. Providing, we didn't have objections from off-set operators.

Q. Now, suppose you had an objection from an off-set operator who wanted to drill on 40-acres. How do you provide for that in your proposed rule?

A. This rule applies to wildcats. I assume it would be the first well.

Q. Now if a man owning a 40-acre tract adjoining the discovery well wanted to drill on that 40-acre tract, direct off-set, to the discovery well, do your rules permit that?

A. No, sir. Not for the first five wells or until the field has been - - -

Q. So until five wells have been drilled, the holder of the off-set 40, would not be permitted to drill a direct off-set but would be compelled to move in a diagonal direction.

A. Would you please define how much of a lease he has?

Q. I don't think it makes any difference.

A. If he has 40 acres only, he could get an exception.

Q. But if he had more than 40-acres directly off-setting the well, and wanted to drill it, would your rule permit him to do it?

A. He could call for a special hearing, I believe.

Q. Now, a man having a larger lease, wanted to drill on the 40-acres directly off-setting the discovery well, would he also have to apply for an exception to the rule?

A. Yes, sir. If he didn't want to - - -

Q. So your rule in its - - -

JUDGE FOSTER: Let the witness answer.

Q. If you have not finished your answer, please do sir.

A. He would - - - State your question to me, please.

Q. I believe - - -

A. I'm getting a little crossed up here.

Q. I will clarify it if I can. The rule as proposed does not provide originally for drilling of an off-set location by a man who owns the off-set 80 except by the granting of a special exception?

A. That's right.

Q. The rules would not permit a direct off-set to the discovery well and could only be done by the granting of an exception.

A. That's right. We're talking about after the discovery well. This is the second well we are drilling?

Q. In your discussion with Judge Foster, did I understand you to say that after the drilling of five or more wells you couldn't come back to an 80-acre pattern if you wanted to?

A. I believe that is - - you can read the rules. The proposed rule states that after five wells are drilled that a hearing will be called before the Commission and the proration unit will be decided at that time.

Q. But did I understand you to say that one of the reasons for proposal of this rule is that if you start on a 40-acre basis you can't change it to an 80? Is that what you said?

A. Yes, sir. I believe I said that.

Q. Do you know of any fields that have operated for some period of time on a 40-acre basis and have then been changed to 80-acre basis?

A. I know of one in New Mexico that tried to and it wasn't successful.

Q. Wasn't there a rather large field in Texas recently placed on 80-acre proration pattern?

A. I don't recall it.

Q. Wasn't it the Spaberry area?

A. Yes, that's right.

JUDGE FOSTER: Fact is, it's on 160 now.

MR. WASHBURN: Incidentally, that Spaberry deal was not the type of development we're talking about here. They merely assigned additional acreage.

JUDGE FOSTER: Just what was the Spraberry picture?

MR. WASHBURN: It was a situation of economy where the operators found out that they were about to go broke.

JUDGE FOSTER: Why?

MR. WASHBURN: Because there wasn't the recovery - there wasn't the oil that was there initially. They'd drilled it fast on 40-acre spacing - - - - - -

Q. How many wells - - -

JUDGE FOSTER: Let him continue about this Spraberry matter. Go ahead and explain.

MR. WASHBURN: They asked - - they had to have relief from the Texas Railroad Commission for wider spacing to more or less - - - from an economy standpoint. And they also proved that the fractured pay that they have there would efficiently drain 80-acre or 160 as it is now. That's all.

MR. SPURRIER: Mr. Witness, the Commission would like to know if you know how these four pools that we have based on 80-acre spacing, how they arrived at that point?

A. No, sir. I don't.

VOICE: Mr. Washburn, Judge Foster has asked you to state the advantages of the proposed rule over the uniform 40-acre spacing which you answered. Now, will you explain the benefits under the proposed order as against the existing rights of an operator upon application to obtain 80-acre exceptions.

A. This rule would automatically start a wildcat out on an 80-

acre spacing with the understanding that after the fifth well or 18 months a hearing would be had and it would be -- evidence would be given to either support the continuation of 80 acres or it automatically would return to 40 acres. Now, -- the other -- give me the last part of that sentence.

VOICE: What advantage would the proposed order in comparison with existing rules whereby an operator can apply to the Commission for an exception whereby he can go in and drill on an 80-acre spacing pattern on showing that this particular field would be more adaptable to 80-acre spacing rather than 40?

A. You're talking about a wildcat against a field. This ruling is merely for wildcat wells so that the Commission can have information at an early date. -- an earlier date. That's all it's supposed to be. I don't see that it has any relation to the last part of your sentence -- of your question.

VOICE: Well, now, it was my understanding that an operator should come in and request an exception. May you not do that after drilling the first well? If they come in and present their case?

A. That's right.

MR. WHITE: Well, then if that be true what advantage does the proposed order have over our existing rule?

A. It will start out on 80-acre spacing with the idea that if it can be shown that 80-acres is the right proration unit that you can continue. If you start out on a 40-acre spacing, you run into this -- problems that you've had in the past.

MR. WHITE: But you still have the right to come in and make application before the Commission for an exception?

A. Right. You do.

MR. WHITE: Now under proposed rule, after you have drilled the five wells or 18 months have elapsed, then the burden is upon the operator to come in and testify for continuance of the 80-acre spacing or else to revert to the 40. Is that correct?

A. That's right.

MR. WHITE: And during the interim of 18 months, if an operator

wants to come in and drill an off-set on 40, would he have to come in and bear the burden of proof to establish the right to drill on 40 as an exception to the 80 whereas under the present rule, he has that right to come before the Commission.

A. That's right.

Q. And he doesn't have to bear the burden of proof to drill on 40. Is that the main feature, as I see it.

A. I think the main one is the fact that the Commission will be furnished information -- when a field first starts, it's going to start on 80-acre spacing, then you can decide what is the proper spacing at the very start.

Q. If that be true, the field can be more readily established on an 80-acre spacing pattern, how do you account for the fact that there have been only four applications for it?

A. I don't know unless it's the difficulty you have in starting 80-acre spacing at the present time in a proven field or in a - - - where's it's not a wildcat.

JUDGE FOSTER: Mr. White, there have been many more applications than there have been those granted.

MR. WHITE: I stand corrected.

MR. GRAHAM: What would be the situation with respect to very small pools? Where all succeeding wells would be dry?

A. If you faced that fact a little further, you could bring that point in a little farther and do it with 40 acres. If it's a small, small pool.

MR. SPURRIER: Does anyone else have a question of the witness?

MR. WALKER: Mr. Washburn, did you have any definite depth - would you recommend any definite depth that these wells should be drilled?

A. You mean the - - are you referring to the 10,000 foot depth?

MR. WALKER: Any well. The reason that I ask that question was because a few minutes ago when Judge Foster was questioning you you made reference to a comparison of the dry holes drilled and the ones that were

producers. And he asked why you made that point and you were apparently suggesting - at least that was the interpretation that I had - that if they had gone deeper, possibly they would have hit oil.

A. That is just guessing. It appeared that the successful wildcat that hit oil was about 2,000 feet deeper than your average dry hole drilled last year.

MR. WALKER: Well then, is there the possibility then that if operators that drilled the dry holes and had they gone another two or three thousand feet, is it possible then that they would have hit oil?

A. From the statistics it would. Now, I don't know the circumstances where they were drilling.

MR. WALKER: I was just curious. I wasn't trying to grill you.

MR. SPURRIER: Anyone else? If not, - - -

MR. ADAMS: R. E. Adams, Cities Service Oil Company. With reference to your statement on the 80-acre spacing that was established in the Spraberry field in Texas, do they permit direct off-set?

A. I believe they do. Yes, sir.

MR. ADAMS: Do you know of any Texas fields where they don't, regardless of the spacing pattern?

A. No, sir.

MR. ADAMS: That's all.

MR. SPURRIER: Anyone else?

JUDGE FOSTER: Mr. Commissioner. I'd like to offer something on this rule that I don't think has been offered here today. But I want to get them in. These rules haven't been entered yet and I'd like to have that marked Exhibit 1.

MR. SPURRIER: Without objection, they will be received. - - It will be received.

JUDGE FOSTER: There was one question there that was asked of this witness by Mr. White, that I didn't ask him. The rule here states 10,000 feet. I don't know if you want an explanation on that or not. If you do, the witness can give it to you - why we set it at 10,000 rather

than 9,500 or 7,000 or 12,000. I believe I'll just ask him to state why, in his opinion, the depth should be at 10,000 rather than another figure.

MR. WASHBURN: I believe that that 10,000 to start with was arbitrary. But there is still -- on the basis of drilling costs, there is some evidence for it. I have a drilling cost analysis on 225 wells drilled by Phillips Petroleum Company in 1951 and 1952 in the West Texas-New Mexico area.

MR. SPURRIER: Would that be the Permian basin?

MR. WASHBURN: Yes, sir.

JUDGE FOSTER: And what's the -- what does that chart show?

MR. WASHBURN: It shows a marked break around 9,500 or 10,000 feet in a cost per foot of depth drill. Wells from 5 to 8 thousand feet have a fairly straight line but when you get to 10,000 feet you get a gentle slope with respect to cost, it's cheaper as you go down deeper, because of heavier rigs and equipment.

JUDGE FOSTER: What are the costs reflected there by the depths with respect to those 225 wells?

MR. WASHBURN: Do you want the average cost per well?

JUDGE FOSTER: Yes.

MR. WASHBURN: Wells -- 3 to 4 thousand feet cost about -- I'm going to round these out - about $45,000.00. From 4 to 5 thousand feet was $57,000.00. From 5 to 6 thousand feet was $69,000.00. From 6 to 7 thousand feet was $85,000.00. From 7 to 8 thousand feet was $95,000.00, 8 to 9 - $138,000.00; 10 to 11 - $253,000.00; 11 to 12 was $255,000.00; 12 to 13 was $317,000.00; and 13 to 14 thousand feet was $392,000.00 per well. That is for well and equipment only - it doesn't include overhead or district expenses or lease-hold expenses. Merely the cost of the well and the equipment that went into it.

MR. SPURRIER: The witness may be excused. Anyone else to be heard in this case?

JUDGE FOSTER: I'd like to reserve the right to put on additional testimony at the next hearing. I've used up all the ammunition I've got here today.

MR. SPURRIER: I thought that that was the intent of the conservation, Judge.

JUDGE FOSTER: Well, I just wanted to be sure.

(Laughter)

MR. SPURRIER: You mean you want to testify or you'll have other witnesses to testify?

JUDGE FOSTER: Well, I would like to testify and probably will.

(Laughter)

MR. SPURRIER: If there is no-one else to be heard, we'll go on to the next case.

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I hereby certify that the foregoing and attached transcript of hearing in Case 407 before the Oil Conservation Commission on April 16, 1953, at Santa Fe is a true record of the same to the best of my knowledge, skill and ability.

DATED at Santa Fe, this 25th day of April, 1953.

Audrey H. Henrickson

My commission expires September 20, 1955.