STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

8 October 1986

EXAMINER HEARING

IN THE MATTER OF:

The cases called on this docket for which no testimony was presented.

CASE 8983, etc. 8998, 8999, 8984, 9000, 9001, 9003

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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For the Applicant:

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

21 November 1986

COMMISSION HEARING

IN THE MATTER OF:

Application of Pennzoil Company for an unorthodox oil well location and simultaneous dedication, Lea County, New Mexico. CASE 9003

BEFORE: Richard L. Stamets, Chairman
Ed Kelley, Commissioner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

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E X H I B I T S

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MR. STAMETS: We'll call last Case 9003.

MR. TAYLOR: The application of Pennzoil Company for an unorthodox oil well location and simultaneous dedication, Lea County, New Mexico.

MR. STAMETS: Call for appearances.

MR. KELLAHIN: Mr. Chairman, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, Pennzoil Company.

I have two witnesses to be sworn.

MR. STAMETS: Other appearances?

MR. PADILLA: Mr. Chairman, Ernest Padilla, Santa Fe, New Mexico, for Barbara Fasken.

MR. BRUCE: Mr. Chairman, Jim Bruce of the Hinkle Law Firm, representing Exxon Corporation.

MR. IVES: Mr. Chairman, Peter Ives with Campbell & Black, representing Phillips Petroleum Company.

MR. ROGERS: Mr. Chairman, I'm James Rogers with Hanley Petroleum, Inc., and we're a part-

ner with Exxon in the New Mexico "EX" State lease, and I have a letter here. The engineering staff and management of Hanley Petroleum, Inc., are in support of Exxon's -- Exxon Company's position with regard to this case, and I'd like to submit this letter to you, please, sir.

MR. STAMETS: Okay.

Any other appearances?

How many witnesses are we going to have in this case?

MR. BRUCE: I have one, Mr. Chairman.

MR. STAMETS: Why don't we have all those who will be or expect to be or may be witnesses in this case stand and be sworn at this time, please?

(Witnesses sworn.)

MR. KELLAHIN: Mr. Chairman, as a preliminary matter, I would submit to you my affidavit showing that we have mailed a copy of the application, identifying the parties that we find to have been affected by this application, and I will submit that for purposes of the record.

Those worked real well, Mr. Chairman. We got most of them here today.

GREGORY L. HAIR,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Hair, for the record would you please state your name and occupation?

A My name is Gregory L. Hair and I'm District Geologist for Pennzoil Company in Midland, Texas.

Q Mr. Hair, would you describe your professional experience and degrees and employment as a petroleum geologist?

A Yes, sir. I got a Bachelor of Science degree from Illinois State University in 1974; Master of Science from the University of Texas at El Paso in geology in 1977.

Went to work for Pennzoil Company in Houston, Texas, in 1976 as a developmetn geologist.

Became an exploration geologist in 1977.

Was transferred to Midland, Texas in 1979.

Since then I've been working Oklahoma, West Texas, southeast New Mexico. My primary area of res-

ponsibility is the Lovington Strawn play; has been for 7-1/2 years.

Q Pursuant to your employment, what has been your involvement in the Shipp-Strawn Field that is the subject of this application?

A I have been the primary geologist for Pennzoil on the Shipp-Strawn play since before the first well was drilled. I was in on the play from the inception. I have participated in every well that Pennzoil has drilled. We have been on every well in the field and done all the office work, also.

Q Referring to Exhibit Number One, would you identify for us what the discovery well was?

A The discovery well on Exhibit Number One was the Pennzoil No. 1 Viersen. It is the well located in the east half of the southeast quarter of Section 4 and it's marked with 74 feet, just for reference.

Q And were you involved in that discovery well?

A Yes, I was.

Q How many wells does Phillips -- does Pennzoil operate in the pool?

A Currently we have three wells producing and one pending.

Q Have you prepared certain exhibits and

testimony for presentation on behalf of Pennzoil in the application today?

A Yes, I have.

MR. KELLAHIN: We tender Mr. Hair as an expert petroleum geologist.

MR. STAMETS: He is considered qualified.

Q Mr. Hair, let's have you orient us, if you will, for a moment by taking Exhibit Number One and explain to the Commission generally where the various operators that have appeared in today's hearing have interests, and let's start with the Phillips interest.

A As I understand it, Phillips Petroleum has interest in the -- it would be the east half of the southwest quarter, and it would be more specifically the southeast of the southwest, southeast quarter of the southwest quarter.

Q In looking at the plat I see a dry hole on the acreage that you've identified as belonging to Phillips Petroleum Company. Can you generally describe in a summary fashion, Mr. Hair, what your knowledge is of that well?

A That was the first well drilled -- well, the second well drilled on this immediate map. It's the Tipperary No. 1 John State. It was drilled prior to the

discovery of the No. 1 Viersen, and it is a dry hole in the Strawn.

Q To your knowledge, Mr. Hair, has Phillips Petroleum Company sought from the Division an unorthodox well location for a well to be drilled on the tract that you've identified?

A Yes, they have. They sought -- or made an application for an unorthodox well location 2500 feet from the west line, 330 feet from the south line of Section 4.

MR. STAMETS: What was that, now, 20 --

A 2400 from the west line.

MR. STAMETS: Uh-huh.

A 330 from the south line.

MR. STAMETS: Well, while you're sitting there, why don't you mark --

A Mark it on there?

MR. STAMETS: -- where you expect that to be on that map?

Q Mr. Hair, I've shown you the original of Exhibit Number One, the Commission's copy, and I ask you to locate in red, sir, the approximate location of the proposed Phillips unorthodox location.

MR. STAMETS: And I presume

that this was the subject of a recent hearing?

MR. KELLAHIN: Yes, sir, it was the hearing on Wednesday in Case 9036.

MR. STAMETS: Just this last Wednesday.

MR. KELLAHIN: Yes, sir.

A I've marked on the plat in a red circle what I believe to be the approximate location, obviously, it's not measured precisely.

Q Let's describe that location in terms of its distance from the Pennzoil proration and spacing unit.

A I believe it's 140 feet from the Pennzoil acreage.

Q All right, and when we look at the Pennzoil acreage, that's identified as the west half of the southeast quarter?

A That's correct.

Q And the Phillips location then is 140 feet, approximately, from that common boundary?

A That's correct.

Q All right, sir, and as we move, then, to the south boundary of the Phillips tract, approximately how far is that unorthodox well location from the south boundary?

A 330 feet.

Q All right. Moving counterclockwise around the exhibit there is a tract to the south that has a well spot on it indicated on this exhibit. Would you describe that well and the ownership?

A That well is a recently drilled well. It's the Barbara Fasken No. 3 Consolidated State.

To explain the well spot there, the black circle is the surface location of the well. The dotted line and the X indicate deviation and the bottom hole location of that well.

Q Can you tell us, Mr. Hair, what the approximate distance is of the bottom hole location of the Fasken well to the northern boundary of that spacing unit?

A I believe it's approximately 510 feet.

MR. STAMETS: As we go through these wells it might be well to refer to the tract numbers where they're shown, that we can make reference to --

MR. KELLAHIN: Okay.

MR. STAMETS: -- at a later time.

A All right, very good. This well, of course, is in Tract 3, the well we've been talking about.

MR. STAMETS: Oh, great. I would have said that was the southwest and not south and I wrote all this good stuff on Tract 2. You'll just have to

wait a minute here while I bring everything up to date?

MR. KELLAHIN: Do you want a new copy?

MR. STAMETS: No, I imagine the record will already show the screwup so the map will be fine.

A Okay.

Q All right, and we left off with the approximate bottom hole location of the Fasken Well on Tract No. 3, and that distance was approximately what?

A 510 feet.

Q All right. As we move now, continuing counterclockwise, into Tract 2, the adjoining spacing unit to the east, would you identify that well and the operator of that well?

A That well is the Exxon No. 2 "EX" State.

Q And the spacing unit for that well is what, Mr. Hair?

A It is the west half of the northeast quarter of Section 9.

Q On this well you have shown the surface loation with the black dot?

A That's correct, and the bottom hole location again is marked with an X.

Q What is the approximate distance of the

bottom hole location of that well to the northern boundary of that tract?

A We believe it to be approximately 150 feet.

Q When we look at the north boundary of the Exxon tract, that is the common boundary with the Pennzoil tract?

A That is correct.

Q All right, sir, now looking at Tract No. 1, the Pennzoil tract, would you identify for us what is indicated by the circle that is not colored in? It's the -- it's not a black circle. It's an open circle.

A Yeah, that is Pennzoil's current proposed location in this hearing.

Q The requested surface location for this case places this well at what distance from the common boundary line between the Exxon property and the Pennzoil property on the surface?

A 150 feet.

Q All right, and what is the surface location then of the Pennzoil well in relation to the Phillips tract to the west of the Pennzoil tract?

A It will be 660 feet from the Phillips tract.

Q All right. You've testified before the

Division before, Mr. Hair, as a petroleum geologist, with regards to this particular pool, have you not?

A Yes, I have.

Q Would you describe for us what has been the history of development and your geologic explanation to describe the pool and the development of this pool?

A The pool was initially discovered by the Pennzoil No. 1 Viersen, as I've stated previously. It's in the east half of the southeast quarter of Section 4. Date of first production on the Viersen No. 1 was August of '85.

Subsequent drilling was the Tipperary No. 1 State 4. This well is the well in the northeast quarter of hte northwest quarter. It's marked with 84 feet on my map.

The first date of production on that well was November of '85.

This was followed by the Pennzoil Viersen No. 2. The Viersen No. 2 is in the west half of the southeast quarter of Section 4.

That well's date of first production was December of '85.

The next well was the Pennzoil No. 1 Shipp. It is the well in the southwest quarter of the northeast quarter of Section 4. It's marked with 77.

That well also began production in

December of '85.

The next well drilled was the Tipperary No. 2-4 State. It is the well in the southeast quarter of the northwest quarter of Section 4. It's marked with 127 feet.

Date of first production was January of '86.

The next well drilled was the Exxon No. 2 "EX" State. It is the well in Tract No. 2, and it's date of first production was February of '86.

The most recent well is the Barbara Fasken Consolidated State. It's in Tract No. 3 and I believe the date of first production was August but I am not positive of that; August of this year.

Q You have testified in the hearings that established and developed the special pool rules for this Shipp-Strawn Pool?

A Yes, I have.

Q Would you refresh the Commission's memory on what the spacing and well location pattern is for standard well locations?

A Yes. The standard spacing unit in this field is 80 acres. The standard location is 150 feet from the center of a governmental quarter quarter section.

Q With regards to the Exxon well in Tract

No. 2, is that well subject to any penalty in terms of its location or its allowable?

A No, it's not.

Q Would you describe now, Mr. Hair, the geology of the Shipp-Strawn reservoir and the significance of the Isopach as you have displayed it before us on Exhibit Number One?

A Production in the Shipp-Strawn is from the Strawn limestone. We believe these to be primarily algal mounds, of small pods of porosity, which are discrete from each other, as shown on my map. You can see I've got several pods defined there. They vary in size considerably, as you can see here. We feel, I would think, an average size would be on the order of 80 acres. That seems to work well in this area.

There's one exception to that and I will point that out later, but they seem to operate independently of each other.

Q When we look at the Exxon well in the pod you have identified on Exhibit Number One, in the absence of any other well, and let's assume the Fasken well is not there, in the absence of any other well, is the Exxon well geologically situated so that it can drain the entire pod?

A Yes, I believe it is.

Q What has prompted Pennzoil to seek its

application before the Commission today with regards to its proposed well in this pod?

A Our purpose here is strictly an issue of correlative rights. We feel that we have a well which is within 150 feet of our lease line. We are asking for an opportunity to drill a like well at risk to find or to encounter the same pod and drain hydrocarbons which may occur on our acreage.

Q In the absence of that approval, Mr. Hair, what can Pennzoil do in order to protect its correlative rights and obtain its share of the reservoir?

A At this point, unless we're allowed to drill a well, nothing, that I'm aware of.

Q Let me direct you now, sir, to Exhibit Number Two and discuss with you the information available on the bottom hole location of the Exxon well.

All right, sir, would you describe for us, identify and describe for us, Exhibit Number Two?

A Exhibit Number Two is a grid showing the mapped view of the deviation of the Exxon well, as we know it. We obtained information from Exxon consisting of a multishot survey, I believe to 9800 feet in the well, and a dipmeter survey which ties into that multishot, which covers the bottom portion of the hole.

From that we constructed what we feel is

the bottom hole location. It is platted here in reference to the section lines. You can see a heavy line through the middle near the top of the page with Section 4, Section 9, on either side of it. That is the section line boundary.

And all of the parameters of the deviation are self-explanatory, I believe, on the -- on the plat.

Q Have you satisfied yourself, Mr. Hair, as a geologist that the information that you examined from which you prepared Exhibit Number Two is reliable?

A Yes, I believe it is.

Q Is it a commonly used information by geologists in your profession to determine bottom hole location?

A Yes, it is.

Q Let's go back to Exhibit Number One, now, and talk about the purpose to which you have put the Isopach, and let me ask you, sir, in constructing the Isopach have you used the surface location of the Fasken well and the Exxon well?

A No, I have not. On the pod which contains the Exxon well and the Fasken well I have used the bottom hole locations for contouring primarily because those are the two wells in this field where I have good bottom hole location information.

Q So you've adjusted your Isopach to show

what you understand the reservoir's orientation and location to be underground.

A That's correct.

Q What purpose have you utilized Exhibit Number One for, Mr. Hair?

A This exhibit was prepared primarily for our use in determining whether a well drilled on the south half of our tract would be an economical well, whether there was, you know, any purpose in our drilling it.

It is primarily to display what I believe to be an interpretation -- reasonable interpretation of the reservoir.

It does not necessarily, it does not absolutely define the productive limits of the reservoir. I have no way of knowing what the productive limits of that reservoir are. There are no data available to my knowledge which define the limits of that reservoir.

Q In light of the fact that the Exxon well is at a bottom hole location only 150 feet from the common line, is the Viersen No. 2 Well on your 80-acre spacing unit to the north, is that well in a position where it can adequately and effectively protect the Pennzoil acreage from drainage by the Exxon well?

A We don't believe so. We -- our information on the Viersen No. 2 Well is the anomalous well in the

field. It is in a very, very small porosity pod. Our data indicates it to cover approximately 10 acres and no more. The well is nearing depletion. It has made somewhere in the range of 70-to-75,000 barrels. It's down in the range of 20-to-30 barrels a day on a pump currently.

As far as we know right now the Exxon well is still flowing, has much better pressure than that and is not in communication with the Viersen No. 2.

Q When we talk about the Exxon well, approximately what producing rates has that well experienced?

A I believe much of its life has been at full allowable, which I believe is 445 barrels a day. I do not know what it is currently making. I've -- hearsay says 300 but that is strictly hearsay.

Q And approximately how many barrels of oil do you understand the Exxon well to have produced?

A Again I'm not positive of the exact figure. I believe it could be in the range of 100,000 barrels, 85.

Q If the Phillips well is drilled as proposed in Tract No. 4, how best can Pennzoil protect itself by drainage by that well?

A Our best solution to that drainage from that well is to impose a penalty on the Phillips well. We feel a penalty there is justified and the fact that they are

not being drained by a well that is too close to their acreage, that they have no severe drainage situation they're encountering; all of the wells are standard in relation to their location, in relation to their acreage; and they have no one encroaching upon them, and we do not intend to encroach upon them, either. 660 feet from the center of the section is a standard location along that direction.

Q In the absence of a penalty on the Phillips location, and should Pennzoil out of necessity have to locate its proposed well 140 feet off of the common line with Phillips, then would you be in a position to protect yourself from drainage by the Exxon well?

A No, absolutely not. Then we have a well 150 feet from our south boundary which encroaches on us. We do not feel there's an adequate location, possibly in the very corner of the section, where we could drill a well that would protect from both, but again you have one well trying to compete with two and it doesn't work that way.

Q So in order to protect Pennzoil's correlative rights you have sought a combination of two things, the approval of the proposed unorthodox location so that you can fairly compete with the Exxon well?

A That's correct.

Q And a penalty on the Phillips location so that they will not be producing at such a rate that they

will drain oil off of your tract.

A That's correct.

Q Based upon your extensive knowledge of the geology of this reservoir, Mr. Hair, do you see any geologic factors that would preclude the Exxon well from draining the Pennzoil acreage?

A No, there are none that I'm aware of.

Q In your opinion, Mr. Hair, will approval of the proposed Pennzoil application have an adverse effect upon the Exxon correlative rights?

A No, I don't believe so. I believe their well is still capable of draining their acreage.

Q If the Pennzoil location is approved without a penalty, will you, in your opinion, have any adverse effects on the correlative rights of Phillips?

A Not that I'm aware of. We are a standard location away from them in that direction and I don't understand that we would have any adverse effect.

Q And finally, will approval of the Pennzoil application without a penalty have any adverse effects on the correlative rights of the Fasken tract?

A No, it is far removed from the Fasken tract and I can't see it would have any.

Q In your opinion, then, Mr. Hair, will approval of this application be in the best interest of con-

servation and the protection of correlative rights?

A Yes, I think it will.

MR. KELLAHIN: That concludes my examination of Mr. Hair.

We move for the introduction of Exhibits One and Two.

MR. STAMETS: Without objection the exhibits will be admitted.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Hair, how have you determined the size of these pods?

A In pods where we have wells we do it primarily from production history and pressure decline.

In the Exxon and Fasken it is strictly modeled after other pods that we know of. We have no pressure information or production decline information at all.

Q So is it conceivable that in your discovery well, that that pod is headed off the other direction? You've just flipped your contours over?

A We have used as an exploration tool in this area seismic. It has been very valuable for us. Our seismic data tells us that the pod is not oriented that way;

that it is the way we show it here.

That is what the discovery well was drilled upon, that very same seismic data, and it was successful.

Q Well, has that seismic data been used in drawing these other pods as well?

A In the ones where we have definitive data, yes. The Viersen No. 1 mound we have very good data. The Shipp mound, if I will, the one to the north, we have a little bit less data. We have very good data over the Viersen 2, and again we have less data over the Exxon and Fasken wells.

Q Okay, is it conceivable that -- that that pod is larger to the south than you've shown it?

A Oh, I think it's very conceivable. Again, I have no way to define the limits of that pod. It could go farther northwest. It could go farther east, south, any direction.

Q Is there going to be engineering testimony on the determination of 10 acres being drained from the Viersen No. 2 Well?

MR. KELLAHIN: I have an engineering witness.

A Yes, there will be.

MR. STAMETS: Are there other

questions of Mr. Hair?

Mr. Padilla?

CROSS EXAMINATION

BY MR. PADILLA:

Q If I may first of all, Mr. Hair, I'd like to have Mr. Hair draw a standard location on the Commission's map here.

MR. STAMETS: If I haven't scribbled it up so much where you can't do it --

A No, I think we can get it done.

Q Let me give you a red pen, also, and have you draw a standard location on your acreage.

A I believe that to be approximately a standard location.

Q Mr. Hair, Mr. Stamets has touched on some of the questions that I primarily have in connection with your testimony here today.

Is there a probability that the pod shown for the Fasken and the Exxon wells and the pod shown for the Viersen No. 2 Well are -- actually touch each other?

A I do not think there is that probability.

Q Do you know if there's some kind of a permeability barrier between those two pods?

A All right. When I address that question

let me back up just a second and since we did not explain fully what the contours on this map were, contours on this map are based on feet of porosity. I used porosity greater than 4 percent.

In my experience where you reach a porosity thickness of approximately 10 feet, 10 fairly continuous feet, not 10 feet scattered out over a 200 foot interval, there will be permeability in the reservoir.

The lack of permeability in these reservoirs throughout the entire Lovington area has never been demonstrated, at least in my experience, unless there is absolutely no porosity.

If you have a minor amount of porosity you will have permeability in the reservoir. So, no, I do not belief there's a "permeability barrier". I think that you just lose porosity totally and you're talking about two separate reservoirs.

Q Mr. Hair, do you have a cross section that would illustrate the loss of permeability between the, say, the Fasken well or the Exxon and the Viersen No. 2 Well?

A No, I do not. Again I cannot demonstrate loss of permeability. No log made that I know of would show that.

Also there's no dry hole between the

wells, so I have no way of demonstrating that, except by engineering data which will be touched on in a few minutes.

Q Well, let me ask you, have you prepared any kind of a cross section that would show that the formation is common underlying all these wells and that as a reasonable geologic probability these wells are in communication with each other geologically?

A Let me make sure I understand your question.

Which wells do you want me -- or are you asking I show are in communication with each other?

Q Well, let's start --

A I don't understand it.

Q Well, let's start from the north and let me ask the question this way. Is the Shipp-Strawn Pool common on the large -- well, underlying or within the wellbores of the wells to the north --

A You're talking about the two Tipperary wells and the Pennzoil No. 1 Shipp. Geologically, again, I have no data between the wells so I cannot tell you.

Engineering data, pressure data, show that those wells are in communication with each other.

Q Were you present during the testimony that your company presented here on Wednesday for the continuation of 80-acre spacing in this field?

A Yes, I was.

Q And wasn't your engineer's testimony that there was some interference between these wells, some of these wells in this pool?

A Absolutely. His testimony was that there is interference between the Tipperaray No. 1, which is marked with 84 feet at the north end of the pool, and the Shipp No. 1, which is marked with 77 feet, and that was the extent of his testimony.

Q Have you done any interference test between your two wells, the Viersen No. 1 and the Viersen No. 2?

A I'll let the engineer testify to that. I am not positive, to be very honest with you. We have better data than that to tell you.

Q Do you personally -- is it your testimony that you personally have not made any study as to any communication between your two wells?

A Depending upon the definition of the term study; I know of various facts which have been done by my company that convince me that there is no communication between the Viersen No. 1 and the Viersen No. 2, nor is there any communication between the Shipp Tipperary pod and the Viersen No. 2.

Q Mr. Hair, how did you decide to draw the

zero lines on the Viersen No. 1 pod and the Viersen No. 2 pod?

A Those, as I've stated previously, are my best geologic interpretation. I have attempted to fit seismic data, pressure data, reservoir size data that my company possess into a geologic interpretation and fit it into the framework that I know the geology to be.

Q And you believe the Viersen No. 2 pod is a limited reservoir?

A I think we can very surely state that, yes.

Q Your engineer is going to have some engineering testimony concerning -- that tests your conclusion?

MR. KELLAHIN: I object to the question. He's asking this witness to speculate on the engineering testimony.

I've got the engineer here. He'll talk about it in a just a minute.

MR. STAMETS: Is that satisfactory, Mr. Padilla?

MR. PADILLA: That's fine. Well, let me put it this way, Mr. Chairman. I'd like the opportunity to recall Mr. Hair if his engineer doesn't testify to this.

MR. STAMETS: Mr. Hair will stay around --

MR. KELLAHIN: What is "this"?

MR. STAMETS: -- and be available for additional cross examination if necessary.

MR. KELLAHIN: I didn't understand the question, I'm sorry.

MR. PADILLA: Well, this line of testimony, if I'm not satisfied by the engineer.

Q Mr. Hair, I have a problem with the -- your testimony. Let me ask you this. You're saying, sir, that you don't have any independent data to justify your own conclusions, is that -- isn't that what you're saying?

A No, I don't believe so. I have much data to justify my conclusions. As a company we've worked out data in every pod except the Exxon and Fasken well. I believe we've shared that data with numerous companies, anyone who's -- just about anyone who's asked for the data has gotten it.

On the other hand, we have attempted to acquire data from Exxon Company about the size of the pod and they've been very reluctant to give data. That's fine, that's no problem.

On that basis on one pod on this map, as I have previously said, I have made my best geologic inter-

pretation of that pod, and no, I cannot tell you, as I said previously, what the size of that pod is. I have no data. I'm not allowed to have that data.

Q Have you asked Fasken for data from their well?

A I am not aware that we have. We have received some data from them.

Q Now, the Fasken well, even though it's deviated to the north, is at a standard location, is it not?

A Absolutely.

Q On your Exhibit Number One, Mr. Hair, I notice the lines that you have drawn identifying I guess it would be the west half of the southeast quarter, and I also see the line identifying Tract 4. Some of those lines are lighter than the other lines and is there any special reason for that?

A I suppose it was put on differently in drafting and in reproduction it came out differently. I have no idea. We did not do it on purpose that I know of.

MR. PADILLA: I believe that's all I have, Mr. Chairman.

MR. STAMETS: Are there other questions of Mr. Hair?

MR. BRUCE: Yes.

MR. STAMETS: Mr. Bruce.

CROSS EXAMINATION

BY MR. BRUCE:

Q Mr. Hair, does the proposed well have a name?

A Viersen No. 3, I believe we'll call it.

Q Just so I won't have to call it "the proposed well".

A I understand.

Q Mr. Hair, I notice on your Exhibit Number One that the porosity lines, especially from zero to 40 feet, are compressed to the south of the Exxon well and to the north of the Viersen 3 Well they're sort of expanded. Is there any reason for that?

A Well, if anything, I was probably trying to be a little generous with Exxon. It moves the thicker part farther south but I suppose if I centered them up I could give us more production that way.

Q You say it would help you to have less porosity on your unit?

A No, I'd have more porosity on my unit.

Q By moving the zero line and 40 line south?

A I wouldn't move the zero line. Again, that's my best interpretation of the reservoir. I'd move all the lines inside of it, leave it alone. If you compress them back to the north a little bit, spread them out toward

the south, you'd move the 80-foot contour farther north and put more 80-feet on our acreage. I think it's pretty obvious.

Q There are other reasonable orientations of the pods, though, is that correct?

A Oh, I did not argue that.

Q And it could be oriented to the northwest, such as the larger pod to the north?

A Oh, certainly.

Q Now, looking at this Exhibit One, couldn't the Viersen 3 be drilled at an orthodox location or such that its bottom hole location would be at a standard location and be at the same position with respect to porosity as the Fasken well?

A Yes, it could, without accomplishing anything to do with correlative rights.

Q You were at the hearing in Case 9036, weren't you?

A Which -- would you --

Q That would be the Phillips case?

A Yes, I was.

Q Did you hear Mr. Groce discuss the Fasken well?

A Yes, I did.

Q Faskens seems to be pleased with the pro-

duction from their well, don't they?

A In their opinion, yes, it's a good well.

Q What is the expected life of the Viersen 2 Well? Do you have that information?

A I would have to speculate.

Q Go ahead.

A I will speculate that it will last another six months.

Q Has that well paid out?

A Yes, I believe it has.

Q Could part of the problem with the Viersen 2 Well be mechanical problems?

A No, I do not believe so.

Q And why is that?

A As our engineer will testify, I believe you'll find that the bottom hole pressure has been reduced so much that they -- we have taken pressure tests, we know what the bottom hole pressure is. The problem is not mechanical.

Q If the Viersen 3 Well is drilled and it made whatever allowable was permitted by the Commission, would the Viersen 2 be shut in and the Viersen 3 produced by itself until production declined?

A I do not know what my company would do on that particular score. I believe that there's a possibility

they could share the allowable. There's a possibility that the Viersen 2, before the well will ever get down, may be plugged, and there's a possibility that we would shut--in the Viersen No. 2 to produce the Viersen No. 3.

Q Now, do I understand you, you said the No. 2 Exxon Well was the first in this particular pod we're discussing here today.

A I believe so, yes.

Q So they took the risk of proving that pod existed, correct?

A In a loose sense, yes.

Q In this Shipp-Strawn Pool are there any currently approved unorthodox locations?

A Yes.

Q And which one is that?

A The Viersen No. 2. And also, I'm sorry, also the Pennzoil -- no -- yes, the Pennzoil Waldron No. 2, which is in the east half of the northwest quarter of Section 3. It's not located on this map.

Q Thank you. Now the Shipp-Strawn Pool was established in Case -- well, OCD Cases 8696 and 8970, is that correct?

A I'll rely on your memory. I do not know the case numbers.

Q Okay.

A 8790.

Q 8790 and 8696, and you testified in both of those, didn't you?

A Yes, I did.

Q And did you not testify that the porosity pods have very high porosity?

A Yes, I did.

Q Have you calculated, according to your Exhibit One, how many acres, just looking at surface acres, of porosity are on the four tracts involved; in other words, the Phillips, Pennzoil, Exxon, and Fasken?

A Based on my interpretation, yes, we have.

Q Would you give us those figures, please?

A Yes. They are down at the bottom in the lower lefthand corner. Tract No. 1, 22.1 acres.

MR. KELLAHIN: Just a minute, his copy doesn't have that.

A Oh, I'm sorry, gave him the wrong copy.

On many of the copies there are a table down at the bottom.

Tract No. 1 has 22.1 acres.

Q Tract -- now hold on, Tract No. 1 --

A Tract No. 1.

Q -- is the Pennzoil --

A That's correct.

Q -- 22.1. Tract 2?

A 18.3.

Q And that's the Exxon?

A That's correct.

Q Tract 4 --

A 18.7 -- oh, I'm sorry --

Q Tract 3.

A Tract 3 is 18.7. That is the Fasken tract.

Q Tract 2 is the Exxon and what is the 41?

A 41? Now you've lost me, I'm sorry.

Q Oh, okay, I was looking at the wrong figure. Okay.

A Tract No. 4 is the only tract we haven't identified and we have it with 1.9 acres.

Q And that is the Phillips tract.

A That is the Phillips tract.

Q And referring back again to Cases 8696 and 8790, in those cases Pennzoil supported well locations up to 330 feet from the unit boundaries, did they not?

A Yes, we did.

Q So the Exxon well was drilled according to the rules then in effect.

A Yes, they would have that title.

Q You said that your location of the pods was at least in part based on seismic data. Had -- had that been submitted to the OCD?

A On one occasion we have submitted, I believe, two seismic lines.

Q What are --

A We consider that for the most part proprietary information and will not submit it.

Q Two seismic lines were submitted?

A Yes, it was part of a -- I don't remember which case it was part of now; some -- one case, in one of the cases, and I'm sure we could find the case number, there were two lines submitted.

Q Now in Case 8790 did you testify that wells spaced too closely together will ineffectively drain the reservoir?

A Which case is 8790? I'm sorry, I cannot refer to --

Q Okay, that is the second hearing on these pool rules, the one called on the motion of the OCD.

A I do not remember precisely that I testified to that. I may have; I may not have. I do not remember.

MR. BRUCE: Okay, Mr. Chairman, I'd like you to take administrative notice of Case 8790 and

particularly Mr. Hair's testimony on page 31 of that case.

MR. KELLAHIN: Can we have a copy of that if it's available so that we can double check on that?

MR. BRUCE: Yeah, that would be --

MR. STAMETS: During the break we could get a --

MR. BRUCE: I'll give it to Florene.

MR. STAMETS: -- copy of that page for everybody. What page number?

MR. BRUCE: Page 31 of the transcript of Case 8790.

MR. STAMETS: Okay, we can put that in the record.

Q What is your estimate of the total size of this particular porosity pod where the Viersen 3 is requested?

A Well, I'll need to add it up here but it's like it's -- a little over 60 acres.

Q Okay. And also in Case 8790 didn't you testify that you recommended that for orderly drainage spacing of the wells should be at least 990 feet apart?

A I may have. Again I do not remember my

precise words.

MR. BRUCE: That's again on Page 31, Mr. Chairman.

MR. STAMETS: Okay.

Q If what I'm stating about Page 31 is indeed correct, Mr. Hair, won't Pennzoil be requesting well locations that go against its previous testimony in establishing this pool?

A No, I do not believe so. I believe our interpretation of the pool has changed significantly since then and this is more of a correlative rights issue than an issue of how far apart the wells should be spaced.

Q Would you characterize the Viersen 2 Well as the poorest producing well in this field?

A Yes, sir, to the best of my knowledge currently, it is. Some of the wells do not have enough production history for me to be able to say certainly that it will be.

Q And what did you say was the cumulative production?

A It's in the neighborhood of 70,000 barrels.

Q Now, if I understand you correctly, Pennzoil is requesting that this well be drilled without a penalty.

A That is correct.

Q Would you be requesting no penalty even if the Exxon 2 Well were not drilled?

A I'm not sure I can answer that question. That doesn't -- that has nothing to do with the facts of this case. I can't answer it; it's a hypothetical thing.

Q Well, experts often testify in hypotheticals.

A I would imagine that that might be a matter of company policy and I do not set my company's policies.

Q Does Pennzoil plan to present testimony that will show it will not obtain oil from its well proportional to the oil under its leases?

A Please repeat the question.

Q Regarding the Viersen 3 Well, does Pennzoil plan to present testimony that would show that the oil recovered from that well is proportional to the oil under its unit, recoverable oil?

A No, I do not believe we do because as I've stated previously, we cannot define the size of the reservoir, how much of it exists on our tract or anyone else's tract.

Q One last question, Mr. Hair, what is your definition of correlative rights?

A Correlative rights and the ability to recover oil under a lease which you hold or royalty that you hold and protection of those from drainage by another person.

Q Thank you.

MR. BRUCE: I have no further questions.

MR. STAMETS: Mr. Ives?

CROSS EXAMINATION

BY MR. IVES:

Q Mr. Hair, in your opinion is there a relationship between structure and porosity in the Shipp-Strawn Pool?

A In my experience there is none.

Q So in none of your seven years of experience with this pool have you seen any relationship between structure and porosity?

A I have seen none.

Q Have you done any structural studies of the Shipp-Strawn Pool?

A Absolutely.

Q What did those structural studies show?

A They show primarily regional dip which is to the east and northeast with minor crenulations or noses

on that. There is production off of those noses, on those noses. They have no relationship to production.

Q Mr. Hair, on Pennzoil Exhibit Number One you have indicated a number of pods. Do you know generally the structure that underlies these pods?

A Yes.

Q Are you familiar with where the structural noses are in the field?

A Yes.

Q If I could ask you just to draw on Exhibit One where you understand the structural noses to be in the field, I would appreciate that.

A May I say that I'm not sure that is a fair statement.

Yes, generally I realize where they are but if I'm going to be pinned down on testimony as to where these noses are and what significance they have, I cannot do that. I don't have any data before me. I can't make a map that is a reasonable interpretation.

MR. KELLAHIN: I think, Mr. Chairman, the witness has given as best an answer he can. He says here during the hearing with the available information he cannot draw the structures for Mr. Ives, and I think he's answered the question as best he can.

MR. STAMETS: Mr. Ives, I pre-

sume you've got a witness who's going to show us those noses and tell us about the impact, is that correct?

MR. IVES: I believe we probably will present that testimony, Mr. Chairman.

MR. STAMETS: I think it might be appropriate for you to present the evidence rather than trying to get Mr. Hair to drag it up from his memory.

Q You indicated that you have done seismic testing in the Shipp-Strawn. Is that correct, Mr. Hair?

A That is correct.

Q Would you be able to draw your seismic lines on Pennzoil Exhibit Number One?

A Absolutely not. We have too many of them for me to remember.

Q Wasn't it your earlier testimony that you had two seismic lines?

A Oh, we presented two seismic lines before the Commission. We have approximately 40 seismic lines in this area.

Q How good a resolution have you been able to get on your seismic tests at 11,300 feet as to the Shipp-Strawn Pool?

MR. KELLAHIN: I'm going to object to the question. It calls for proprietary information and we're not prepared to discuss the seismic

information for Mr. Ives or anyone else today.

MR. IVES: Mr. Chairman, the witness has testified that in part his Exhibit Number One, which shows a number of pods in the pool, was based on seismic lines and seismic testing which has been done.

I think his having developed Pennzoil Exhibit Number One on that basis makes it certainly a fair question with regards to how much resolution he gets on the basis that that's (not clearly understood) he has made.

MR. STAMETS: Mr. Ives, are you asking the degree of confidence that Mr. Hair has in the seismic data that they have acquired?

MR. IVES: I'm curious to try and get some objective measurement or sense from Mr. Hair how much he has been able to tell based on the seismic lines. He's indicated that they've been able to establish and see the pods on the basis of the seismic testing; but, for instance, he's also testified that they can't tell the extent of the pods based on that seismic data.

So I'm trying to find out exactly what the seismic testing has shown in this particular instance, the resolution at 11,300 feet being (inaudible.)

(Thereupon a discussion was had which was inaudible to the reporter.)

Q Mr. Hair, let me ask you --

MR. STAMETS: As long as -- as long as you can stay away from proprietary issues, I think it's appropriate to ask questions to determine the degree of confidence which is placed in the seismic data.

Q Mr. Hair, it was your earlier testimony that you were able ot see the pods based on your seismic testing, is that correct?

A Yes.

Q And was it not also your prior testimony that you couldn't tell the extent of those pods based on your seismic testing?

A I'm not positive that was exactly what I said. I'll restate it, if you like; we can check the record, if you like, but --

Q I'd certainly appreciate your clarification on that point.

A What I feel is to a reasonable degree we can tell the extent of the pods.

I believe I testified that I have no data with which to tell the size of the Fasken/Exxon pod, if you will, and I think that primarily is due to our lack of seismic data in the area.

As you can note, these are extremely small pods. It takes a tremendous amount of seismic date. I have previously testified we have over 40 lines on this map. We do not have adequate lines ot be able to tell the definition of this pod, of the Exxon/Fasken pod.

Q So then do you have adequate seismic data in order to determine the extent of the two pods which are to the north and the east of the Exxon/Fasken/Phillips/Pennzoil pods?

A We feel that we do, yes.

Q How exactly, using that seismic data, were you able to determine the extent of these pods?

A I believe that again gets into proprietary information. That's what we're using for an exploratory tool, is the method. That is proprietary. I'm sorry.

Q So you can't tell us exactly how using your seismic you were able to determine the extent of the pods?

A Not without touching on proprietary matters. It goes into the very heart of how we define the pods to drill to begin with.

Q So there is no way I can get you to tell me exactly how determine the extent of the pods in this particular instance.

A I will volunteer an answer for you and I hope it will satisfy you. You don't seem to take proprietary after the Commissioner has already said it, but we feel that in a vertical sense, in other words, limestone thickness, we can predict the thickness of the Strawn lime within 10 percent. To us the thickness of the Strawn lime, as I've testified previously at these hearings, is the key to production in these limestones.

We feel that way within 10 percent.

We feel laterally we can predict within 15 percent.

We also feel on numerous of these pods that our engineering data is much better in determining the size of the pods and the areal extent than our seismic is because it's generally believed to be much more accurate.

Q And is it your testimony that there is -- well, let me ask you, if you would, to define for me exactly what your zero prime line on your Exhibit Number One is designed to indicate.

A That is where porosity is at zero feet. Prime is foot in this case. It is zero feet of porosity.

Q Let me ask you, if you would, I believe you've indicated on the exhibit which the chairman has, your Exhibit Number One, where the unorthodox location proposed for the Phillips well is, is that correct?

A I believe so, yes.

Q And is the location that you have put that proposed well on inside the pod the outside the pod at zero prime line?

A As I have defined the pod for the purposes of this map it is outside.

Q Notwithstanding the fact that it is located outside your pod, you're proposing to impose a penalty upon the Phillips location?

A As I previously testified, this map is an interpretation based on my best judgment. I have no limiting factors as to the size of the pod. I do not know that the Phillips well will be outside of the zero porosity.

Q But on your Exhibit Number One, as you have drawn that, based on your best determination, it does lie outside the pod, does it not?

A Yes, it does.

Q What would be your response to the imposition of a penalty based on productive acreage in the Shipp-Strawn Pool?

A As a field -- a pool rule? I don't think it's feasible.

Q So you would not support such an allowable based on productive acreage?

A Not at the present time.

Q So in terms of your testimony that you are not able to accurately define any of the size of -- sizes of the various pods, information contained on your Exhibit One may or may not be accurate, is that correct?

A I never said such a thing. I never made that statement.

Q Do these -- does Exhibit One represent an accurate depiction of the Shipp-Strawn Pool?

A I believe it's a very accurate representation except for the Exxon/Fasken pod, which I have no information on other than two well logs. They do not determine areal extent.

Q Mr. Hair, one final question, why is that Pennzoil then is proposing a penalty based on productive acreage to be imposed against Phillips in tihs matter or in the matter which was heard yesterday or the day before as Case 9036?

A I don't believe we put on any testimony that showed that there was a penalty necessary; however, I will answer it.

Again, I have no way to define the productive limits. I believe that if you drill a well at a standard location because you are not -- you have no one encroaching upon any of your lease boundaries, you should, that's where you should drill it.

If you do not drill at a standard location, you should receive a penalty.

I feel that our case is different because we a well encroaching, 150 feet from our lease boundary. All we're asking for is the opportunity to drill a well in a like position opposite of that well, moving no closer to anyone else except the encroaching well.

Q Do you think that your proposed location would drain any reserves under the Phillips tract?

A I have no idea.

Q I believe before you testified that the Exxon well in Tract No. 2 had the ability to drain the entire pod, is that correct?

A That is correct.

Q But you have no notion whether your well would be able to drain the acreage under the Phillips tract.

A I have no notion whether there's any oil under the Phillips tract.

MR. IVES: I have no further questions.

RECROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Hair, would you tell us the degree of confidence which you've got in the pod size for the Viersen

3?

A I'll -- probably --

Q You know, you've testified your knowledge of the area, and so on. How confident are you that that's -- that that's -- about it?

A I'm -- I'll say fifty/fifty. I think it could be larger. I don't know. In the absence of pressure data it's very difficult to tell.

As you can see by the size of the three pods here, they do vary considerably in size and without the pressure data it's very difficult.

Q The two wells, the Fasken and the Exxon wells, that deviated, were those intentional deviations or just migrations?

A No, absolutely not. They were not intentional deviations.

Q And how did you acquire the bottom hole location information?

A I believe we received it voluntarily from Exxon after a protracted period of time, and from Fasken, I -- it was voluntary and I believe it was immediate.

Q In your own wells have you seen a standard deviation as they are drilled?

A Yes.

Q In what direction is that?

A In -- where we have information, we do not have it in every well, it is generally to the north; every well where we have taken bottom hole surveys, it is to the north.

Q Would you be taking -- perhaps you're not the one to ask this question of -- but if you know, would you be taking any special precautions to drill a straight hole for the Viersen 3 or would you allow it to migrate?

A Okay. I can't answer that, but let me give you an answer.

Basically it would depend, I would assume, on how the Commission feels about the matter, one; number two, about the cost involved, is it prohibitive. We don't know. I do not know of my own knowledge whether it's a prohibitive cost; whether is it not worth in the risk we're taking, anyway, as can be shown by the dry holes on the map; there is still considerable risk even while we're asking to drill.

We do not know at this point.

Q Again, these questions may be more appropriate for the engineer. Do you know what the allowable is in the Shipp-Strawn Pool?

A 445 barrels a day.

Q 445, and your No. 2 Well is producing 35?

A I think it's between 20 and 30 right now,

sir.

Q Okay. What did you say the Exxon well is producing?

A I don't have current datas and I'd hate to speculate. If they'd supply it that would be fine. I -- I'm of the impression it's around 300 barrels a day but I do not know.

Q You would -- do you anticipate if the Commission imposed a requirement that the Viersen No. 2 be kept on production as long as it's econmically practical to do so that that would have any impact upon your desire to drill this well?

A No, I don't believe so. As I testified previously, my best estimate is that the Viersen No. 2 will not be productive for more than six months. It may be but certainly not much more than that and I don't believe that that is going to be a problem ultimately.

MR. STAMETS: Any other questions of this witness?

MR. KELLAHIN: I have a couple of follow-up questions.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Just so that it's clear to me, Mr. Hair,

if the Commission should require the No. 3 Viersen Well to be drilled at its closest standard location, will that give you an opportunity to compete fairly with the Exxon well in the absence of a penalty on the Exxon well?

A Let me amplify that, my answer just a little bit. I want to -- what I want to put in here is no, I don't believe it will.

The Exxon well is 150 feet from our lease line. In a standard location I believe we can be 510 feet from the lease line.

Number one, that is at a surface location. We are -- I just testified that there is a deviation problem in these wells. Very possibly that would put us as much as back at 660 feet.

Again, I haven't been treating my map as gospel and I don't intend to start now, but based on the map that puts us in a very poor position insofar as the reservoir as I've defined it goes.

Also, again I cannot testify to the cost of keeping the well straight. I do not know whether it is prohibitive, but we have not done it previously and I don't even know whether it's possible, for that matter. That is also a risk for us.

Q In terms of balancing an order that allows Pennzoil to compete fairly with the Exxon well, does,

in your opinion, because of the close proximity of those two wells to each other, does the size and orientation of the reservoir matter to any significant degree?

A I don't believe it does.

Q In terms of establishing allowable and perhaps you -- I need to save that question, but I'll ask you, based upon your knowledge, would establishment of an allowable that was equal to the current producing rates set for the Exxon well allow you to compete fairly for your share of the oil underlying your tract?

A Yes, I believe that would be equitable.

MR. KELLAHIN: I have nothing further of Mr. Hair.

MR. STAMETS: Any other questions?

The witness may be excused.

We'll take about a fifteen minute recess.

(Thereupon a recess was taken.)

MR. BRUCE: Mr. Chairman, I marked as Exxon Exhibit One-A Page 31 of the transcript of Case 8790, and if there are no objections, I would move that that be entered as part of the record.

MR. STAMETS: Okay, well, let's show that we're on the record, then.

Mr. Kellahin, do you want this witness back?

MR. KELLAHIN: Yes, sir, I'd like an opportunity to recall Mr. Hair to have him make an explanation of the reference to his prior testimony.

During the break he's had an opportunity to examine Page 31 of his prior testimony in an earlier transcript, and I would like to have an opportunity to ask him to respond.

MR. STAMETS: Okay.

GREGORY L. HAIR,

being recalled as a witness and remaining under oath, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Hair, we've recalled you as a witness and I ask you if you've had an opportunity to refresh your recollection about the circumstances pursuant to which you made the testimony as indicated on Page 31 of the prior transcript in an earlier hearing?

A Yes, I have.

Q Can you give us any comments or background to give us insight as to the fact situation upon which that statement was made?

A Yes. The statement that's in question here, I'll refer to it, we were trying to provide for orderly drainage by spacing these wells 990 feet apart to keep the area of drainage, in quotes, from overlapping so extensively.

This obviously is intended under ideal conditions. It's under noncompetitive conditions. It is meant to provide for ideal drainage. It does not, however, when you have a well 150 feet from your lease line take into any consideration correlative rights.

MR. KELLAHIN: I have nothing further, Mr. Stamets.

MR. STAMETS: Any questions of Mr. Hair?

RECROSS EXAMINATION

BY MR. BRUCE:

Q Yes, Mr. Hair, how often is the oil and gas business noncompetitive?

A At least part of the time. I can't give you an exact number for that.

Q Did you expect that in this field?

A I expected that all wells would at least be an adequate distance from the boundary of the leases to protect correlative rights. I believe the Exxon well, while it was unintentional, is not far enough away from the boundary of the lease to protect correlative rights.

Q But the Exxon well was drilled according to pool rules proposed by Pennzoil and by you specifically (inaudible).

A I did not say that. I said unintentional deviation brought it too close to the lease boundary and caused a lack of protection of correlative rights.

Q And the 330-foot surface location was proposed by Mr. Greg Hair (inaudible).

A Yes, it was.

MR. STAMETS: Any other questions of Mr. Hair?

Mr. Padilla?

RECROSS EXAMINATION

BY MR. PADILLA:

Q Mr. Hair, you're not retracting the statement you have made in lines 10 through 13 of that Page 31, are you?

A You're assuming the statement about excellent permeability in the wells?

Q Yes, sir.

A Yes, I am not retracting that. Those wellbores have excellent permeability.

Q Let me -- your Shipp No. 1 is the well shown with 77 feet up there in your Exhibit Number One, is that correct?

A There are two wells with 77 feet. The Shipp No. 1 is the well in the southwest quarter of the northeast quarter of Section 4.

Q And your -- well, in that Page 31 are you comparing the permeability of the Shipp No. 1 and the Viersen No. 2 Well?

A I am comparing the permeability found in the wellbore of the Viersen No. 2 with the wellbore of the Shipp No. 1 -- I'm sorry, Viersen No. 1.

All three wells I have compared the wellbore data. I cannot tell you what the permeabilities are or the porosities are with numerical accuracy away from the wellbore.

Q What is the average porosity in those wells?

A In the Viersen No. 1 the porosity ranges from 4 to 10 percent and I would say 6 to 7 percent is average.

In the Viersen No. 2 and the Shipp No. 1

the porosity, effective porosity, ranges from 4 percent to approximately 12 percent, and I would say 8 percent is average.

Q What would you say the porosity for the pod and the Exxon and the Fasken wells is, the average porosity?

A In the Exxon well the porosity, I believe, is very much on a part with the Viersen No. 2 and the Shipp No. 1.

The Fasken well has slightly lower porosity. I would say it is more on an average of like 7 percent instead of 8.

Q Mr. Hair, how did you determine the permeability of 42 millidarcies as stated in that -- toward the bottom of the page in that Page 31?

A I personally did not determine that permeability. That came from core data, drill stem test data, which I am privy to because it is something that we ran.

Q Who ran that? Who made that calculation?

A Service companies which we hire. I cannot -- I cannot remember which particular service company tested each well, or I do not remember which core. They were all reputable service companies.

Q Mr. Hair, do you agree with the -- well,

let me ask the question this way.

On Wednesday of last week in the hearing to continue the spacing rules at 80 acres, your engineer presented an Exhibit Four where he stated the average field porosity was 8 percent. Do you agree with that?

A Yes.

MR. PADILLA: I believe that's all the questions I have.

MR. STAMETS: Any other questions of the witness?

He may be excused.

MR. KELLAHIN: Mr. Chairman, we'd call at this time Mr. Paul Bruce.

PAUL L. BRUCE,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Bruce, for the record would you please state your name and occupation?

A My name is Paul Bruce. I'm currently Production and Drilling Manager for Pennzoil Company in Midland, Texas.

Q Would you describe for the Commission what degrees you have?

A I have a Bachelor of Science degree from the University of Texas in Austin.

Q And in what year, sir?

A In 1970.

Q Would you summarize for us what has been your educational -- I'm sorry, your work experience as an engineer?

A I worked for approximately five years with Exxon in South Texas.

I worked for a small independent named Roy Huffington for three years in overseas assignment, and I've been with Pennzoil approximately nine and a half years at this point in time.

Q Which --

A I've worked for Pennzoil both in South Texas and in West Texas, currently in my -- in my current position for five years as Drilling and Production Manager in the West Texas Division -- District.

Q Within the period of time you have been Drilling and Production Manager for Pennzoil, has one of the areas of responsibility been the Shipp-Strawn Pool in New Mexico?

A Yes, sir, it has.

Q Would you describe for us what has been your personal involvement with the exploration and development of the Shipp-Strawn Pool?

A I've supervised all of the engineering aspect of putting studies together, doing evaluations, worked closely with the geologist in obtaining data, been involved in all the exploration efforts on an information basis.

I've supervised all of the drilling activities and the acquisition of pressure data, core data, and all of the reservoir data that we have obtained.

Q Would you describe for us what is your concern with regards to the Pennzoil acreage identified on Exhibit Number One as Tract 1, what your concern is about that acreage with regards to the Exxon well immediately to the south of you?

A Our concern is simply that the data that is available to us has led us to conclude that the Viersen 1 and the Viersen 2 and the Shipp 1 are all in three separate reservoirs. The Shipp 1 being the well to the north -- in the northeast quarter, marked 77, being competitive with two Tipperary wells immediately to the west. But primarily the concern is that our pressure data leads us very conclusively to believe that the Viersen 2 is in a very limited reservoir, it is almost depleted, and that the Exxon well, while

-- although not intentionally deviated, did deviate, did encounter deviation problems, was completed at a bottom hole location of approximately 150 feet from our lease line, 146, to be exact, according to the data that we have, and therefore Pennzoil probably has recoverable, economical reserves on its Tract 1 which it should be allowed to recover.

Q While we're talking about the bottom hole location, your estimate is that the Exxon well's bottom hole location is about 146 feet from the common line?

A That's correct.

Q And what information do you have available to you, sir, with regards to the estimated bottom hole location on the Fasken well?

A We have no hard data of which to calculate that bottom hole location; however, it was -- we were informed by the Fasken representatives, and they have been very cooperative in sharing data with Pennzoil from the very beginning, we were informed that their well deviated some 276 feet to the north, which would put its bottom hole location approximately 390 feet from the lease line.

Q What attempts have you made concerning your efforts to obtain information from Exxon about their well and how it is being produced and operated so that you could satisfy yourself that the Pennzoil property was being protected?

A Let me begin by saying that we were well aware of the drilling problems and the deviation problems that Exxon encountered while they were attempting to drill and complete their "EX" No. 2 Well.

Q Is that going to appear to be a common problem?

MR. STAMETS: Mr. Kellahin, before we go too much farther, I don't think we ever qualified this witness.

MR. KELLAHIN: All right, sir, I'll work that in.

MR. STAMETS: And let me ask what his bachelor's degree was in in 1970.

A Chemical engineering.

MR. STAMETS: And your experience since that time has been in what phases of the engineering?

A While with Exxon I was trained and worked in reservoir engineering and production engineering and overseas I worked in reservoir and drilling engineering.

With Pennzoil I've been involved in all aspects of petroleum engineering.

MR. STAMETS: All right. I presume that there are no questions and the witness is considered qualified.

MR. KELLAHIN: At this point, Mr. Chairman, we tender him as an expert.

MR. STAMETS: He is considered qualified.

Q Mr. Bruce, you were describing for us the efforts that you have made to inform yourself and your company about what their correlative rights were with regards to the Exxon pod and we were discussing with you what efforts that you have made with regards to understanding the information available from the Exxon well.

A I was stating that we were well aware of the drilling and deviation problems that Exxon encountered while drilling their well.

Q Do you anticipate that that kind of problem will continue to occur with regards to the drilling of the Viersen No. 3 Well?

A Every well that's been drilled in this area has experienced some deviation problems typically, and speaking for Pennzoil, our experience has enabled us to keep those deviation surveys down -- or deviation limits at about 3 degrees.

The Exxon well and the Fasken well apparently encountered more severe problems and those problems appear to be related to the position, the southerly position, and their deviation got up to 7 degrees.

Q If a surface location is approved for the Pennzoil well 660 feet from the Phillips tract and 150 feet from the Exxon tract, and assuming the deviation continues and you experience the type of deviation that Exxon did, where will your bottom hole location be in relationship to the Exxon well, the common line between you and Exxon?

A If our well deviates as much as the Exxon well did, we'll be starting out at 150 and they had approximately 180 feet of deviation, so 150 and 180 is 330.

Q What information do you have available to you concerning production information and bottom hole pressure information on the Exxon well?

A We were given, and we have obtained from Exxon, the original DST pressure data. Of course we've been able to obtain production data through the Commission, and Exxon also shared with us a bottom hole pressure build-up survey which they ran in March or April, I believe, of 1986, shortly after putting their well on production.

That is the extent of the pressure of production data that we have from the Exxon well.

Q In your opinion, Mr. Bruce, as an engineer, is that information sufficient enough from which you can calculate the size of the Exxon reservoir?

A I think not. In fact it is my opinion that there is a good possibility that the Exxon well and the

Fasken well may not be in communication, although we have shown them as such on our Exhibit One.

We have o basis for saying they are not or that they are. We requested, when Fasken completed their well in Tract 3, and we obtained the DST data, pressure data from Fasken.

We also requested at that point in time that Exxon would consider running a bottom hole pressure in their "EX" No. 2 Well, because we already had the experience and knew that we could determine to a fairly accurate degree the size of the reservoir if we had good pressure data. Exxon refused or declined to run a bottom hole pressure at that point in time.

Fasken produced their well for one month and ran another bottom hole pressure and at that point in time we also requested that Exxon run a bottom hole pressure so that we could determine whether or not those two wells are in a common reservoir and also whether or not the reservoir that Exxon is in is even big enough to worry about; however Exxon declined again to run a bottom hole pressure.

We witnessed the fact that Exxon's well had a pumping unit installed upon it and while they had that rig there we even offered to pay for a bottom hole pressure survey, but they declined.

So in my opinion Pennzoil has no other

alternative than to ask for this opportunity to protect our correlative rights.

Q From available current information you are unable to calculate or determine the size of the reservoir that the Exxon well is producing from?

A That's correct.

Q What, in your opinion, is the impact of having either the Viersen No. 1 or the Viersen No. 2 producing from the Shipp-Strawn reservoir in relationship to the Exxon well?

A Absolutely none.

Q Do you have an opinion as to whether or not either the Viersen 1 or 2 can adequately protect the correlative rights of Pennzoil in relation to the Shipp -- to the Exxon well?

A We have pressure data from the Viersen 1 and Viersen 2 which leads us to conclude decisively that they are not in the same reservoir and that they are not either one in the reservoir which Exxon is completed in.

Q All right, let's turn, sir, to what has been marked as Pennzoil Exhibit Number Three and have you identify and describe that exhibit.

A This exhibit is the bottom pressure history of our Viersen No. 1. As you can see, it was completed in August, 1985, with an original pressure just slightly

over 2450. The decline was rather rapid and the latest bottom hole pressure information we had on August the 1st, 1986, the pressure was below 1400 pounds.

Q Let's turn now, sir, to Exhibit Number Four and have you identify and describe that exhibit.

A Exhibit Number Four is a similar bottom hole pressure history of our Viersen No. 2. It again was initially completed with a bottom hole pressure of in excess of 2450 pounds in November of 1985; however, you can see that its bottom hole pressure declined much more rapidly and that the latest pressure point that we had in April, 1986, which is the point that we installed artificial lift equipment on the well, its bottom hole pressure was below 800 pounds.

Q As we turn to Exhibit Number Five, would you identify and describe that exhibit?

A Exhibit Five is a similar bottom hole pressure history for our Shipp No. 1 Well. You can see that its bottom hole pressure again initally was above 2450 and it has had a much sower decline rate.

We have shared our bottom hole pressure information with Tipperary, the offset operator to the west, and they have shared their bottom hole pressure with us, and their bottom hole pressures correspond very closely with our Shipp No. 1.

Q Based upon this information what do you conclude with regards to this data?

A Exhibit Four clearly indicates that the Viersen 2 is in a separate pod by itself. Its bottom hole pressure is much lower than either the Vierseon 1 or the Shipp 1.

We also, by running a pressure on the same date, on August the 1st, 1986, have concluded that the Viersen 1 and the Shipp 1 are in separate reservoirs. Their pressures vary by almost 400 pounds.

Q What is the approximate current producing rate on the Viersen No. 2 Well?

A Approximately 30 barrels a day.

Q And do you have an estimate, Mr. Bruce, of the approximate area that that well is able to drain and develop?

A Using our production decline curve and volumetrics, we calculate approximately 10 acres.

Q What is your understanding with regards to the current producing rates of the Exxon well?

A Like Mr. Hair before me, we aren't quite sure. Much of the data we have through the Commission shows it producing top allowable at least down until about August; however, we have witnessed in the field that the well apparently had declined some and has had a pumping unit installed

upon it; however, we are also of the -- or have the understanding that the well has been acidized and returned to a flowing status and its rate we do not know.

Q Is it common for your company to acidize its Shipp-Strawn wells?

A We acidize all of our Strawn wells.

Q In terms of correlative rights, Mr. Bruce, will the proposed unorthodox location for your Viersen No. 3 Well allow you the opportunity to fairly compete with the Exxon well?

A Yes, it will, if we're allowed to drill and complete a well as close to the lease line as they are.

Q With regards to a penalty on the Pennzoil location for this well, do you have a recommendation to the Commission?

A We believe that the well should not be penalized due to its location request.

Q With regards to the Phillips tract to the west of your location, if their unorthodox well location is approved, will you be able to fairly compete with that well using the Viersen 3 location in the absence of a penalty on the Phillips tract?

A No, we will not.

Q Were Exhibits Three, Four, and Five compiled by you or prepared under your direction and supervi-

sion?

A Yes, they were.

Q And to the best of your knowledge, information, and belief, those documents are accurate and correct?

A Yes, sir.

MR. KELLAHIN: That concludes my examination of Mr. Bruce.

We move the introduction of Exhibits Three, Four, and Five.

MR. STAMETS: Without objection they will be admitted.

Are there questions of Mr. Bruce?

Mr. Padilla.

CROSS EXAMINATION

BY MR. PADILLA:

Q Mr. Bruce, have you done any interfering -- interfernce tests between the Viersen No. 1 and the Viersen No. 2 wells?

A Yes, we have. We attempted and performed a fairly expensive interference test between the Viersen 1 and Viersen 2 and proved to our satisfaction that they were not in communication very early in the life of their produc-

tion.

We believe that the pressure decline curves more than confirm that conclusion from those interference tests.

Q Mr. Bruce, let me show you the -- I believe it was Exhibit Number Five that was introduced at the -- by Pennzoil in the hearing to extend the 80 spacing rules.

Can you identify that --

A Yes, I believe that was --

Q -- exhibit?

A -- Exhibit Five. It was also an exhibit in our original case for 80-acre rules. It is a bottom hole pressure build-up analysis, a Horner plot, of the pressure build-up in the Viersen No. 1 and from it you can see the calculation using the slope of 18 psi per cycle, calculating the permeability of 43 millidarcies.

Q Does that permeability measure -- does that exhibit measure permeability at the well or away from the well?

A I believe the bottom hole pressure information measures the permeability, the effective permeability as deep into the reservoir as the pressure transient is traveling.

In other words, if the -- if the depth of

investigation, depending upon the time, is 200 feet, then it's using an average permeability for the entire reservoir from the wellbore to that 200 feet.

Q And that concludes that the permeability is 43 millidarcies, is that correct?

A Yes, it does, to a depth of investigation of whatever it was in the Viersen No. 1.

Q But that does not show that that is the permeability at the wellhead -- the wellbore.

A As I said, it -- the calculation shows an average permeability for the reservoir, the entire thickness wellbore to the depth of investigation.

We have core data which shows permeability that also was submitted, if you are looking for actual permeability at the wellbore.

Q Do you know what the depth of investigation was for the Viersen No. 1 in calculating this exhibit?

A No, I do not recall at this time what the depth of investigation was.

MR. STAMETS: Other questions of this witness?

Mr. Bruce.

CROSS EXAMINATION

BY MR. BRUCE:

Q Referring to Exhibit Four, Mr. Bruce, that curve shows the well will deplete at about 71,000 barrels?

A That is correct.

Q Hasn't testimony already been produced that it's produced approximately 75,000 barrels?

A Yes, sir, that is correct, and I would be happy to explain that difference.

As you probably are aware, when a -- when multiple wells are completed on a lease they are commingled within a given battery and this is the case here, and our production records which have actually been submitted to the State are based on allocations of well tests that are turned in on a periodic basis.

We have more well tests than we turn in to our computing system and because of that the inaccuracies have occurred. We have a very good handle on the amount of production that has come from the Viersen No. 2, and the excess between the current cumulative of about 65,000 that we believe and know to the 75,000 which have been reported to the State is a result of that inaccuracy and that excess has come from the Viersen No. 1 Well.

Q Well, isn't it necessary to have accurate records regarding royalties to the State?

A Yes, it is, and we are in the process of correcting those records.

Q You just testified that Pennzoil's wells averaged 3 degree deviation, is that correct?

A I believe that's correct.

Q Have you calculated what that amount of deviation would be at a bottom hole 11,300 feet?

A I believe if you will review the records where are basically no deviation problems in most of the wells down to approximately 8700 feet. All the deviation problems occur between 8700 and 10,000, and we actually have a deviation survey in our Shipp No. 2.

The Shipp No. 2 Well, I don't believe has been identified today in the course of this procedure but it is the dry hole in the northwest corner of the northeast quarter of Section 4.

That deviation survey indicated the bottom hole location of that well was approximately 80 feet to the north of its surface location and its maximum deviation was 3-3/4 degrees, if my memory serves me correctly.

Q If the well did deviate the full 3 degrees for 11,300 feet, what would that figure be?

A I don't know. I haven't bothered to cal-

culate that.

Q Could you?

A Sure.

Q Would you?

A I don't see that it has any relevance.

MR. STAMETS: Mr. Bruce, we'll be happy to let your witness give us that information.

MR. BRUCE: Thank you.

Q Now you were aware of the Exxon well's deviation as it was being drilled, were you not?

A Yes, sir, I testified to that.

Q Did Pennzoil ever protest to Exxon about that deviation?

A We did not because we were uncertain as to the extent of its deviation. We did contact Exxon. We requested dipmeter and surveys upon completion and we did finally get the 9500-foot multi-shot survey in April. We got the dipmeter survey in late August and at that point in time we notified and informed Exxon that we were concerned and we filed our case for an Examiner's Hearing which was then subsequently moved to this particular hearing.

Q I'll ask you, Mr. Bruce, the same question I asked Mr. Hair, if Pennzoil does make a top allowable on -- or whatever is allowed by the OCD on the Viersen 3, would Pennzoil shut-in the Viersen 2 and produce the Viersen

3 alone until production declined?

A And I'll answer essentially the same way that Mr. Hair did. To us it makes no difference. We can do it any way the Commission would like for us to do it. We'll be glad to share an allowable. We'll be glad to shut-in the No. 2, or whatever they wish.

Q Have you calculated -- referring to the Viersen 1, or I mean Viersen 2 Well, excuse me, Mr. Hair previously stated that it was about 10 acres in extent, that particular porosity pod.

A Yes, that's correct.

Q Have you calculated -- made any calculations regarding recoverable reserves under that porosity pod under that well?

A The reserve estimate that we are using of 75,000 barrels, as explained the difference a moment ago between the current 75 and what we believe the real 75 to be, was used in the volumetric calculation to come up with the 10 acres. We have good reservoir pressure and production data which establishes a production decline curve which is very difficult to refute, and that ultimate recovery of 75,000 barrels will fit back into the reservoir volume as shown on Mr. Hair's map.

Q So you --

A Using the --

A Did you make a calculation?

A Yes, we did. Using the porosities that he has mentioned, using the recoveries of 30 percent, 25 percent. If the recoveries are as high as 42 percent as testified in Phillips in Wednesday's hearing, then this size of the reservoir is even smaller.

Q So you used a 25 percent recovery factor. What water saturation did you use?

A 15 percent.

Q 10 acre pod size, correct?

A Maximum.

Q Maximum. What average porosity thickness?

A 8 percent, the porosity.

Q The porosity, what --

A We planimetered the shown pod on each Isopach contour.

Q So you didn't use an average?

A No, we did not.

Q Mr. Bruce, is there any evidence of fracturing in this formation?

A Our recoveries of cores that we have in the field lead us to believe there is some fracturing; however, most of the fracturing that we see is in the relatively tight areas of the reservoir, or of the Strawn, and we do not detect as much fracturing in the good porosity

intervals.

Q Would the fracturing increase the permeability or the ability of a well to drain the porosity pod?

A I would certainly think so.

Q Getting back to your reservoir calculation, which reservoir volume factor did you use?

A We used a reservoir volume factor of 1.5. I believe testimony was presented Wednesday by Phillips that it was 1.4. We have actual bottom hole samples of oil which we have done pvt work on which show it to be 1.49.

Q In your opinion would one well in the Shipp-Strawn Field in a porosity pod drain at least 80 acres?

A Yes.

Q And if the Phillips well and the Pennzoil well are approved, there will be about -- there will be four wells in this approximately 60 or so acre pod?

A There'll be four wells in this particular pod if they are all together. Yes, that's correct.

As Mr. Hair testified a moment ago there could be more than 60 acres.

Q Mr. Bruce, would Pennzoil have requested -- be requesting that this well be drilled without a penalty if the Exxon well wasn't located in this porosity pod?

A We would not be here requesting the per-

mission to drill a well at all if the Exxon well were not already encroaching toward our lease line.

Q But that doesn't quite answer the question. If you were going to drill this well and the Exxon well was not there, would you still request no penalty?

A We would certainly expect a penalty for any well at an unorthodox location if it weren't for the -- if there were no correlative rights problems already existing. We have repeatedly taken that position before the Commission and that is our position.

Q If the Exxon well were not there would you be asking to drill at a legal location?

MR. KELLAHIN: I'm going to object to the question. It asks for an assumption that's not relevant to this case.

The only reason we're here is because it is there, Mr. Chairman. He's asking this witness to assume it's not there.

MR. BRUCE: Well, I think --

MR. KELLAHIN: It it's not there, we're not here.

MR. BRUCE: I think it's relevant to question of penalty on this well.

MR. STAMETS: Mr. Bruce, are you asking would Pennzoil under normal circumstances be

willing to drill within 150 feet of the center of the quarter quarter?

MR. BRUCE: Yes.

MR. STAMETS: That seems a fair question.

A If we believed that there were another pod south of our Viersen 2, we would -- and if the Exxon well were not there, we would be asking to drill the well at an orthodox location or if we chose to come unorthodox, we would expect a penalty.

Q And due to the high permeability of this reservoir, would a well at an orthodox location generally drain 80 acres or a signficant portion thereof?

A I'm sorry, I did not understand your question.

Q Assuming a well at an orthodox location in -- the Viersen 3 Well at an orthodox location.

A If we discovered the new pod with an orthodox location as Viersen No. 3, I would still believe that it would be capable of draining the entire pod no matter how big it is, unless it's significantly bigger than any we've found to date.

Q Did Pennzoil do an economic evaluation of this well to determine justification for drilling the well?

A Yes, we have.

Q And in that evaluation did Pennzoil assume any penalty assessment?

A We have run multiple economic cases for several alternatives, several situations. I suppose one of them could be tailored to a penalty situation. We know how many barrels it takes to pay out a well. We know how many barrels the average recovery is, and we've run multiple cases in between.

Q Were any specific penalty figures used?

A No.

Q So there was no specific penalty figure at which you concluded that the proposed well would be uneconomic.

A No, I did not.

Q Just for my own edification, do I understand that you did not calculate the reserves of oil under the Viersen 3/Exxon pod?

A No, we have not. We can easily calculate it as drawn on our map; however, as Mr. Hair testified, that's only a single interpretation. We may have more productive acreage under that tract. Phillips may have more productive acreage under its tract. Exxon could certainly have more acreage under its tract, as shown, and therefore we have not estimated an ultimate recovery for that reservoir.

I would like to. That's why I requested the bottom hole pressure from Exxon but I was not allowed that (unclear).

Q There's no requirement that Exxon give you that information, is there?

A Certainly not.

Q Has Pennzoil estimated the life of the Viersen 3 Well if drilled at its proposed location?

A No, because we have not estimated the recoverable reserves.

Q Just a couple more, Mr. Bruce.

I wasn't listening too closely when Mr. Hair was testifying before. How many wells does Pennzoil have in the Shipp-Strawn, productive -- producing wells?

A Three. We are completing our fourth, which is the little circle up in the northwest quarter of the northwest quarter.

Q Of Section 3?

A Of Section 3, yes, to the east.

Q And of those three current wells, have they all paid out?

A Yes, they have. Fortunately the bulk of the production was produced when oil prices were $28.00.

Q And the Viersen 2 was economical, was it not?

A Yes, because, as I stated, it recovered the pay out volume of oil of about 45,000 barrels while the price was still $28.00. I think at today's prices it would just barely pay out at 75,000 barrels.

Q Mr. Bruce, when we talked just shortly -- a short while ago about your calculations on the well evaluation, how could you run your well economies without calculating the life of a well and reserves?

A Our well economics are based on an average recovery in this particular area of 320,000 barrels per well. That's what we use it on; that's what we use in our economics.

We also know that at $28.00 it took approximately 40,000 barrels to pay out the well and at today's prices it takes approximately 70 or 75,000 barrels.

Q So for the Viersen 3 you're going to assume or Pennzoil is assuming that it will recover 320,000 barrels.

A Our econmics have always been based on the average recoveries. We've done numerous studies in the area that show that.

Q Getting back to your calculations on the Viersen 2, you stated that for porosity you did planimetering. What figure did you come up with your --

A For what?

Q When you planimetered your porosity?

A For acres?

Q Yeah.

A 10, total. There's 10.something acres within the zero contour shown on Mr. Hair's map.

Q And what was the maximum porosity thickness?

A 77 feet for the central, the middle contour.

MR. BRUCE: I don't think I have anything further, Mr. Chairman.

MR. STAMETS: Mr. Ives, do you have any questions?

CROSS EXAMINATION

BY MR. IVES:

Q Mr. Bruce, it was your previous testimony, was it not, that given the presence of Exxon No. 2 Well you feel that no penalty should be imposed on Pennzoil if it is allowed to drill at its proposed location?
Is that correct?

A That's correct.

Q And if the Exxon well were not there, and Pennzoil drilled its well at the proposed location, you would be amenable to the imposition of a penalty, is that

correct?

A Again, you're asking me to presuppose. I wouldn't be here but if I were asking it for 150, I would expect a penalty.

Q Notwithstanding that, and given the presence of the Exxon well, Pennzoil's position is that a penalty should be imposed upon Phillips, is that correct, in connection with its proposed location to the west?

A Yes, because Phillips does not have a well offsetting it at 140 feet, as Phillips is requesting to drill a well.

Q Could you estimate for me, if you would, the productive acreage for your proposed well on the Pennzoil tract, as shown on Exhibit One?

A As Mr. Hair testified, this is only one interpretation and we have no pressure data, and I've testified we have no pressure data, to confirm that this is the right interpretation or the right size, but as it is shown, and we've put into testimony, on some of your Exhibit Ones it's actually shown that Pennzoil has 22.1 acres, or 772-acre feet of reservoir there.

Q Is that total acreage only with regards to your proposed well location or also your Viersen 2 location?

A Only within the zero line of the pod as

illustrated by Mr. Hair's map to the south.

Q So that does not include any acreage in connection with Viersen No. 2.

A Correct.

Q And your estimated productive acreage for the Phillips tract based on your Exhibit Number One is 1.9 acres, is that correct?

A That's correct.

Q And notwithstanding those two facts you propose that no penalty be imposed on Pennzoil in connection with its proposed location but that a penalty be proposed on -- imposed upon Phillips in connection with its proposed location, is that correct?

A I believe that's what we've said over and over, yes.

Q How far off the quarter quarter section line is your Viersen No. 2 Well?

A If I recall correctly, the surface location is 20 feet south of the quarter quarter section line. It could be 10; I'm not absolutely sure.

Q And do you know what the distance from the east/west lines are?

A No, I do not recall. It's more than 660, if I remember right. It was 330 feet from the unit, eastern proration unit line.

Q And why was that drilled, that well drilled at that unorthodox location?

A When we first began our exploration in this area, we felt like that we needed, because of the small, limited extent of these pods, we needed the flexibility to get within 330 feet of an 80-acre proration unit. We asked for those rules at the original field rule hearing. That field rule hearing was -- those field rules were approved initially but due to some legal problems they were later revised to the 150 feet from the center of a quarter quarter section line; however, all of the locations that had been permitted up to that point in time, including the Exxon well at 330 feet, and the Viersen 2 at 330 from its eastern proration unit, were grandfathered in as standard locations, except that we had taken the double precaution of having an unorthodox location for the Viersen 2 at that point in time, also, in case the field rules were not approved. That was some of the history there, but it was drilled at that location because that's where our seismic said it was the best spot.

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

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Bruce, on Exhibits Three, Four, and Five it appears as though there's one rate of decline for the first 10,000 barrels and then a changing rate of decline or a different rate of decline after that.

Do you have an explanation?

A Yes, sir, that's very easy to explain if you know the bubble point.

That volume on the earliest pressure decline is associated with the amount of oil that's produced above its bubble point. Once the bubble point occurs, or in reality that pressure turns out to be 50 to 100 pounds below the actual bubble point of the oil, you see this shift in decline rate or bottom hole pressure decline rate, and it's -- it's very simple -- it's very simply the actual results of what a reservoir engineer would do on a material balance not knowing all the reservoir pressure data but knowing the pvt data and the initial bottom hole pressure.

This is -- with that data a reservoir engineer would initially model it, but we've taken the actual data and shown you what the model would look like if we had done it from the beginning.

Q Looking at Exhibits Three and Five, it looks as though there's a slightly different bubble point

between those two exhibits.

A That's correct. We only have a bottom hole sample with pvt data showing the bubble point in one well and our experience is that the actual point was about 100 pounds below what it calculated out on the pvt work, and I think that's reasonable because of the averaging of the reservoir pressure away from the wellbore.

However, it is apparent that those bubble points, or effective bubble points, vary somewhat from pod to pod.

Q Is that further indication of isolated reservoirs?

A I don't think it would be conclusive to that but it certainly supports our belief of that.

MR. STAMETS: Are there other questions of this witness?

He may be excused.

Do you have another witness?

MR. KELLAHIN: No, sir, that completes our direct case, Mr. Chairman.

MR. STAMETS: I think this is probably a good time to break for lunch and be back here at 1:15.

(Thereupon the noon recess was taken.)

MR. STAMETS: The hearing will please come to order.

Since -- unless there is another desired order, since Mr. Padilla spoke up second, we'll allow him to proceed at this time.

MR. PADILLA: Mr. Chairman, I have one witness, and call Mr. Groce.

JAMES GROCE,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. PADILLA:

Q Mr. Groce, for the record would you please state your name and by whom you're employed?

A James Groce. I'm a petroleum engineer for Henry Engineering, which is a wholly owned subsidiary of Barbara Fasken.

Q Mr. Groce, did you testify here in connection with the application of Phillips Petroleum Company for an nonstandard location north of your well?

A Yes, sir.

Q Have you previously testified before the

Oil Conservation Division and had your credentials accepted as a matter of record?

A Yes, I have.

Q As a reservoir engineer?

A Yes, sir.

MR. PADILLA: Mr. Chairman, we tender Mr. Groce as an expert witness in this case.

MR. STAMETS: He is considered qualified.

Q Mr. Groce, let's first of all start by having you state what your position with Barbara Fasken is in this case.

A Our position in this case is the same as our position in the Phillips application, that the field rules have been established for this field. We feel like the well spacing is adequate to drain 80 acres as presented; that standard locations can effectively protect correlative rights and prevent waste, and that we feel like standard locations should be drilled in this field.

Q Mr. Groce, let me hand you what we have marked as Exhibit Number One, and this is also an exhibit, Mr. Chairman, that we tendered in the Examiner Hearing.

Mr. Groce, would you tell the Commission what that is and what it contains?

A This is an interoffice memo that was

directed to me by Mr. Mark Merritt, who is a petroleum engineer for our firm and who works under my supervision. It is the results of a pressure build-up analysis that we ran on our Consolidated State No. 3 Well in October of this year.

Q What are the conclusions reached in that memorandum, Mr. Groce?

A Based on an anlysis of the build-up we determined that the well had very good permeability in the order of 99.7 millidarcies; that based on the production of our well, the bottom hole pressure at the time we drilled the well, and the bottom hole pressure we measured at this time, we made a material balance of the oil in place that this well was effectively seeing; that that amount of oil was considered to be 245,000 barrels of oil in place; that based on the average reservoir parameters that we determined at our wellbore, being 14 feet of pay, 6 percent porosity, and 25.7 percent water saturation, that volumetrically that area would be approximately 87 acres.

Q How does that relate to locations as required by the field rules?

A That is the field rules, an 80-acre location, and that would be approximately the size of a proration unit.

Q Do you think that it is necessary to have

wells located at nonstandard locations in order to adequately drain an 80-acre proration unit?

A I do not. One of the additional conclusions that we made on this analysis based on information furnished to us by Exon in the pressure analysis of their well, which is the "EX" No. 2, that offsets us to the east, we concluded that we were in communication with their well; that this communication was demonstrated by the fact that their flowing tubing pressure declined very rapidly after we brought our well on production.

We asked them to lrun some interference tests with us to confirm this and they were not willing to, since they were preparing for this hearing, but we made the assumption that since we were in communication that our average reservoir pressure at our well, or measured at our well, would be the same reservoir pressure that their well was seeing.

Based on their original reservoir pressure and our average reservoir pressure and their cumulative production, we calculated that the original oil in place of their well was approximately 4-million barrels.

Volumetrically we calculated that their pay thickness would be some 63 feet. Using 6 percent porosity and calculating with the same water saturations, we determined that that areal extent would be some 272 acres.

Q Mr. Groce, has either Phillips or Pennzoil presented any evidence in either of these two hearings concerning the nonstandard locations that would show the kind of data you have just testified to?

A No, sir.

Q Mr. Groce, this morning you heard Mr. Bruce testify that Pennzoil had conducted interference tests between the Viersen No. 1 and the Viersen No. 2 Wells, did you not?

A Yes, sir.

Q Wouldn't that be the best type of evidence to submit to this Commission to show that there is no communication between those two wells?

A Yes, sir, it would.

Q Is it your testimony today that the data that is available is sufficient to define the reservoir in a more accurate way than has been proposed by Pennzoil?

A Yes, sir. There is evidence available to support our conclusion based on the information we have and that information has been available to Pennzoil and Exxon when they've requested it from us.

Q Mr. Groce, what is the size -- what is the acreage dedicated to your well?

A 80 acres.

Q And how is that configured?

A We have an east/west 80-acre proration unit on the north half of the northwest quarter section.

Q Mr. Groce, do you have any evidence that leads you to conclude that that 80-acre spacing unit is not entirely productive?

A No, sir.

Q Mr. Groce, if you will, would you clarify a question that was -- came up this morning concerning your bottom hole location.

A Yes, sir. There's been some discussion about the bottom hole location. It did drift north; however, the actual course that it took was a northwest course and then back to the northeast for some 270 feet. The triangulation of that bottom hole location, as my best recollection is, it's approximately 150 feet north of our surface location.

Q Is that still a standard location?

A Yes, sir.

MR. STAMETS: The surface location is 660 from the north line?

A Yes, sir.

MR. STAMETS: And so we've got 660 and 150 feet and that 150 feet is what's allowed by the rules.

A Yes, sir.

MR. STAMETS: Okay. That's basically the same thing that Pennzoil said, it's 510 feet from the line.

A Yes, sir.

Q Mr. Groce, do you have anything further to add to your testimony?

A Yes, sir. I'd like to point to Pennzoil's Exhibit Number One, which is their Isopach map.

As we asked Mr. Hair earlier, they had drawn a standard location on that map. I would like to point out that they have indicated our well has approximately 12 feet of pay on that. Their standard location would be even better than that, having approximately 20 feet from their contour.

Our well is a flowing, top allowable well. It has been flowing since late August, some 90 days now, has made allowable every month. Our cumulative production is in the order of 40,000 barrels. It is in communication, or we feel it is effectively competing with Exxon's well. We feel that that adequately demonstrates that standard locations in this reservoir can compete; that they can protect correlative rights, and that in fact spacing on any closer distance than that could cause interference between the wells, a reduction in the recoveries and therefore waste.

Q Well, you brought up something now, Mr. Groce. Let me have you explain to the Commission what you feel with regards to the Viersen No. 2 as being an unorthodox location. How could that affect waste?

A Our interpretation of the rapid depletion of bottom hole pressure in that area could well be the result of interference from other wells that are already producing in the area. We feel that that unstandard location has resulted in a less than average recovery for the wells in the area and that then very conceivably could be because it is closer than it should be to the other wells.

Q What affect would result if you had four wells bunched up around the bottom well in Exhibit Number One of Pennzoil in the common corner of Tracts 1, 4, 3, and 2?

A That would be the equivalent of spacing on 40-acre spacing units. We've already seen testimony entered in the field rules hearing that said that the wells on 80-acre spacing do interfere with each other. That would be very close spacing, even closer than 80-acre spacing, and there would be a considerable amount of interference in those wells.

Q Would that create -- or could that create reservoir waste?

A In -- yes, sir, in the - in draining an

80-acre proration unit the most effective method would be to space the wells on normal locations at opposite ends of the 80's, if you would, so that they would be a maximum distance from each other. This would maximize recovery in that 80.

Putting them closer than that does create interference and the wells competing with each other and having more difficulty draining the edges of the reservoir that are opposite those wells.

Q Would having to drill additional wells to adequately drain an 80-acre proration unit constitute economic waste?

A Yes, sir.

Q Anything further, Mr. Groce?

A No, sir.

MR. PADILLA: Pass the witness, Mr. Chairman.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Groce, you've indicated that you believe the Fasken well is draining 87 acres.

A That is correct.

Q And is in communication with the Exxon well, which is draining 272 acres.

A Yes, sir.

Q I'm not exactly clear on how you can have two wells in communication draining two different areas that are that much different in size.

A All right, the -- at the time we made the analysis the -- our well was seeing only 14 feet of the reservoir. The Exxon well was seeing an additional 39 feet. It is our contention that some of this may be stratified and some of the area that the Exxon well was exposed to may not be in pressure communication because of laminations.

Q Okay. Does the size of the -- of your estimate of the Exxon reservoir, does that make it reasonable to conclude that there is some productive acreage in this pod underneath the Pennzoil tract in the southwest of the southwest of Section 4?

A Yes, sir.

Q If that is the case, and given -- and given that we would accept Pennzoil's estimate of the No. 2 Well only draining 40 acres in that 80 acres north of the Exxon well, how will Pennzoil be able to produce their share of the oil out of that portion of the reservoir if they're not able to drill?

A Well, we're not objecting to them drilling. We're objecting to them drilling at a nonstandard location.

If they conclude in their analysis that

they have not affected that lower portion of the 80, then we feel that their evidence indicates that they can do it with a standard location, and because of the excellent permeability of the reservoir, that a standard location would compete effectively with Exxon's well, even though their location may be closer. The reservoir doesn't care.

Q Looking at what has been drawn on Pennzoil's Exhibit Number One, I see it looks as though a standard location would be on about the 20-foot Strawn lime Isopach.

A Yes, sir.

Q And your well is probably, oh, about 15 feet.

A Yes, sir.

Q And you've indicated that because of the difference in thickness of those between, perhaps, your well and Exxon, Exxon is draining a portion of the reservoir that you're not connected to.

A That's correct.

Q Now, looking at -- comparing Exxon, Exxon's well and the proposed Pennzoil well, it would appear as though if Pennzoil located at the standard location they might be in the same position you are, not contacting all the potentially drainable reservoir under their tract.

A Yes, sir.

Q If we accept that because of the Exxon loation the oil is being drained from the southwest quarter southwest quarter of Section 4, in a fairly thick section of Strawn, how will Pennzoil be able to protect themselves from drainage in the thicker section unless they locate closer to the thicker portion of the Strawn reservoir?

A Well, our -- our position there is that they could take their chances. We took our chances by drilling a standard location. We certainly would have liked to have crowded up next to the lease line and taken advantage of all the pay that was present but we drilled the location recently under the new field rules. We drilled it as a standard location and it was a risk. We took that risk. We feel like the other operators should take the same risk and that they could adequately protect themselves by doing so.

Q Pennzoil has indicated they've got 22 acres, more or less, productive in the southwest soutwest of Section 4. Do you think it would be appropriate to base a penalty on -- on 22 acres?

A It would be my opinion that if they were unwilling to drill a standard location, that they would probably be so on the grounds that they think there's very limited areal extent on their acreage and in that respect, yes, I would support a very severe penalty for their application.

Q Just a quick analysis would lead me to believe we'd be looking at an allowable which would be something like to 27/28 percent of a standard allowable, maybe 120/125 barrels a day. Do you think such an allowable might help to protect the correlative rights of the other owners in the -- in this area of the pool?

A Yes, sir.

Q I wasn't clear on how locating two wells in this proximity, one the Exxon well and the proposed Pennzoil well, would cause waste.

A This -- this reservoir, because of its very, very good permeability, now I refer to their average of 43, our calculate 99, you're able to cover a wide drainage area with one well.

When you space all those wells in one portion of the reservoir, those wells are going to see the pressure effect, the pressure drawdown, if you will, from each other. That gives them more difficulty in effectively drawing in the reservoir from other areas where other wells might be further spaced away from them. It would be more difficult for them to compete equitably.

Q Okay.

MR. STAMETS: Are there other questions of the witness?

MR. KELLAHIN: Yes, sir.

MR. STAMETS: Mr. Kellahin.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Groce, what effort did you make to prepare the memorandum that's shown on your Exhibit Number One that's signed by Mr. Merritt?

A I supervised Mr. Merritt's work in preparing the exhibit, or the memorandum.

Q The memorandum indicates 272 acres on a volumetric basis underlying the Exxon share of the reservoir?

A That is -- we made no estimate of where that acreage lies. The method that we used does not determine areal extent. We determined the reservoir size from the pressure and volumes at the wellbore itself.

Q This represents, then, the total size of the reservoir what we have described as the Fasken/Exxon pod?

A Yes, sir.

Q And out of that pod, then, you calculate Fasken's share at what percentage or what -- what number of acres?

A 87 acres.

Q You get 87 acres out of the 272.

A Yes, sir.

Q Okay. What portion of that acreage number out the 272 do you attribute to the Philips tract?

A If I -- I know whether you're going, if I may, I --

Q Well, you want to go along with me or you going to go somewhere else?

A No, I'm going to go along with you.

Q Okay.

A If I may qualify this, it's my -- if I were putting this 272 acres on the map, I would put 80 acres under our well, 89 acres under Exxon's "EX" No. 2, and 80 acres under the tract north of that in the Pennzoil tract. The remaining would be approximately 32 acres, which the evidence that Phillips indicated in their hearing would be under their tract.

Q Well, you've gone where I wanted to go. I was going to ask you how you would divide the reservoir among the various operators and you've given 80 to Exxon, 89 to Pennzoil, 32 to Phillips, and 87 to yourself, or 80 to yourself, right?

A Yes, sir. I'm not greedy; I'll just take the 80 and the other 7 we'll share.

Q Well, we're not greedy either, we just want our fair share. When we talk about Mr. Stamets' ques-

tion on Pennzoil's Exhibit Number One, he asked you whether or not it might be equitable to allocate Pennzoil's allowable based upon 22 acres out of 80.

A Yes, sir.

Q And ypu thought that was all right.

A Yes, sir.

Q If we're going to try to allocate production among the four wells that are drilled or to be drilled, then would it also not be fair to allocate that production to the other three tracts based upon their share of the acreage, also?

A I have no objections to that.

Q So when we look at Tract No. 2, the Exxon tract, if we're allocating 22 acres to Pennzoil, then we could allocate 18 acres to Exxon; we can allocate 18 acres to Fasken; and then about 2 acres to the Phillips tract.

A Excuse me, you lost me on that. I thought we were discussing the 272 acres, are we not?

Q We shifted gears.

A All right. In that case --

Q All right.

A -- I'd rather you restate your question.

Q Okay. Mr. Stamets asked you to give us comments concerning the allocation of the reservoir as depicted on Pennzoil's Exhibit Number One.

A Yes, sir.

Q Let's assume that this is some way to allocate it.

A Okay.

Q Each of the four tracts has got 80 acres dedicated to it and yet we are going to allocate the acres based upon this plat, and we're going to derive a penalty for the Pennzoil well based upon the relationship that this acreage number, 22 acres, has to an 80-acre allowable. All right?

A Right.

Q And you said that was all right.

A Yeah, as I said, I did not follow your question because I -- since I was not privileged to te drawing of those acreages, I could not comment to that question.

If it's Pennzoil's contention that they only have 22 acres on their tract, then I think that's a reasonable penalty based on what they have entered in evidence, but before I would penalize everyone else's well, I think that we should discuss, review, and look at the size of the reservoir in those tracts.

Q Well, don't misunderstand me, I don't adopt that approach, either, I'm just following up on Mr. Stamets' suggestion that --

A Right.

Q -- at least one way to conceptualize a solution for balancing the equity --

A Uh-huh.

Q -- would be to look first of all at the Pennzoil tract. If you want to allocate it based upon this plat, for which you and I both disagree, then we take 22 acres out of the 80, and I believe your answer was, yeah, that was okay, we could derive a penalty based upon some type of acreage factor.

A My answer was that if Pennzoil does not drill a standard location, then I would say it's because they do not believe that they can effectively drain their acreage from a standard location, which leads me to believe that they do not have a full 80 acres available.

We are not advocating a penalty. We are advocating a standard location.

Q Okay. Is your position going to be the same if that Exxon well was 150 feet from you as opposed to being 150 feet from the Pennzoil tract?

A As far as I know now, from the information my boss has provided me, yes, sir, it would be.

Q Okay.

A They were grandfathered into the field. We understand that it's difficult to make retroactive rules and that we feel that if the field rules are adopted by the

Commission they are considered equitable and we believe in abiding by them unless there is something that we feel is very, very mitigating in the circumstances.

Q So if you had the Pennzoil acreage you wouldn't propose to drill 150 feet off the Exxon, the common property line between Exxon and Phillips.

A No, sir.

Q You'd move back to a standard location.

A Yes, sir.

Q You want to trade acreage with us?

A If you'll give us the cumulative that you've gotten off of your well.

Q What is the -- what is -- what is the distance, and I don't think I have it yet on my map, what is the distance from your Fasken well to the common property line that separates you from the Exxon spacing unit?

A 512 feet.

Q You're 512 from that line?

A Yes, sir.

Q And how far away is the Exxon well from your common line?

A I believe it's 330 but I don't -- is it 660?

Q I kind of think it's 660.

A I'll accept that. I'd have to look at

the location again. I don't have that -- well, I've got it in my notes but if it's 660, I'll accept that.

Q It appears that give or take 100 feet, you and the Exxon well, and the Fasken well are about the same distance from the common line between the two.

A Yes.

Q Mr. Groce, when we look at that line that runs vertically between the east side of your spacing unit and the west side of the Exxon spacing unit, and as we continue that line on up north, it's the same line that divides Phillips from the Pennzoil tract.

A Yes.

Q Is that true?

A Yes.

Q All right. When we look at the Pennzoil location, it is 660 from that common line, at least that's the proposed location on the surface, and that is greater distance from that line than is permitted from -- from the existing pool rules, is it not?

A Yes, sir.

MR. KELLAHIN: I have no further questions. Thank you.

MR. STAMETS: Are there questions of this witness?

He may be excused.

MR. PADILLA: Mr. Examiner, we tender Exhibit Number One into evidence.

MR. STAMETS: Exhibit One will be admitted.

Let's see, Mr. Bruce, I think you're next.

MR. BRUCE: Yes, Mr. Chairman. First, we have an additional witness who needs to be sworn.

MR. STAMETS: Okay.

(Witness sworn.)

WILLIAM T. DUNCAN, JR.,

being called as a witness and being duly swor upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BRUCE:

Q Would you please state your full name and city of residence?

A William T. Duncan, Junior, and my city of residence is Midland, Texas.

Q And what is your occupation and who is your empoyer?

A I'm a reservoir engineer with Exxon Cor-

poration.

Q And have you previously testified before the Division or the Commission as a reservoir engineer and had your credentials accepted?

A Yes, I have.

Q And have you reviewed engineering matters at least with respect to the pod of porosity surrounding the Viersen 2 Well, as put forth by the Pennzoil witnesses today?

A I've been present for the testimony by Pennzoil and have reviewed their exhibit, Exhibit One.

MR. BRUCE: Mr. Examiner, is the witness considered qualified?

MR. STAMETS: He is.

Q While you were present, Mr. Duncan, did you listen to the testimony of Mr. Paul Bruce regarding the size of the porosity pod underneath the Viersen 2 Well?

A That's correct.

Q And did you also review Pennzoil Exhibit Number One?

A Yes, I did.

Q And did you note the numbers given by Mr. Bruce regarding calculations on the Viersen 2 pod size?

A Yes, I did.

Q Did you make a calculation with the num-

bers given by Mr. Bruce?

A Yes, I did. I took the numbers that were included in Pennzoil's testimony for the number of acres in that pod, the porosity, average porosity in that pod, the water saturation, the recovery factor, the oil formation volume factor, and the recoverable reserves, and saw for the height of the pod, it would be the average thickness of the pod.

Q And are your calculations contained on Exxon Exhibit One-B?

A Yes, they are.

Q And what do those numbers show?

A It shows that the pod thickness would have to average 80.7 feet for the pod to be as described in Pennzoil's testimony.

Q In other words, for the pod to be 10 acres in size.

A That's correct.

Q And the testimony of Pennzoil shows that tahe maximum pod thickness is 77 feet, is that correct?

A That's correct.

Q From that -- from your calculations what do you -- what conclusion do you draw regarding the size of the Viersen 2 pod?

A One of the variables, another of the var-

iables in the volumetric equation is probably in error. Because of the one variable that is particular to this pod is the area, and therefore the thickness of the pod if probably less than the 77 -- the average thickness if probably less than the 77 feet shown in the Viersen No. 2 and therefore the acreage for the pod is probably much larger.

Q And was Exhibit One-B prepared by you?

A Yes, it was.

MR. BRUCE: At this time I tender Exhibit One-B into evidence, Mr. Chairman.

MR. STAMETS: Exhibit One-B will be admitted.

MR. BRUCE: I have no further questions of the witness at this time.

MR. STAMETS: Are there questions of Mr. Duncan?

MR. KELLAHIN: Yes, Mr. Chairman.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Duncan, have you conducted similar volumetric calculations on any of the other pods depicted on this exhibit?

A No, I have not.

Q Have you conducted volumetric calculations for any of the Isopachs prepared by your company with regards to any well in this pool?

A No, I have not.

Q Prior to today have you been involved with any of the engineering aspects of the Exxon well?

A Only to the degree that I helped preapred the testimony but I did not do the engineering.

Q Were you involved in the drilling, engineering with regards to the drilling of the Exxon well?

A No, I was not.

Q Is Exxon a participant as a working interest owner in any other well in the Shipp-Strawn Pool other than the Exxon well we've described within Tract Number 2?

A (Unclear).

MR. KELLAHIN: I have nothing further.

MR. STAMETS: Any other questions of this witness? He may be excused.

DAVID ANDREWS,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. BRUCE:

Q Mr. Andrews, would you please state your full name and city of residence?

A Yes. David John Andrews. I reside in Midland, Texas.

Q And what is your occupation and who is your employer?

A I'm a petroleum geologist with Exxon Corporation.

Q And would you please state briefly your educational and employment background?

A Yes. I received a Bachelor of Science degree in geology from the University of Texas. I graduated in the fall of 1980.

In the spring of 1981 I went to work for Exxon Corporation and for the last 5-1/2 years I've been employed as a geologist for Exxon.

The first four years of that time was spent in Oklahoma City in our Oklahoma City Exploration District. As a geologist there, of course generated wells, analyzed competitive proposals and did regional geological studies.

The last year and a half has been spent

in the Midland District and I've been working there as a production geologist. While there my duties have been fairly similar to those that I was occupied in at Oklahoma City.

Q And have you been qualified as an expert witness before any other state commissions?

A Yes, I have. I've been qualified before this one and before the Railroad Commission in Texas.

Q And when were you qualified for this one?

A That was two days ago in the Phillips hearing that's been referred to earlier.

Q Case 9036?

A I believe that's right, yes, sir.

Q And are you familiar with the geology in Case 9003?

A Yes, sir, I am.

MR. BRUCE: Mr. Chairman, I tender the witness as an expert geologist.

MR. STAMETS: He is considered qualified.

Q Mr. Andrews, I'm handing you what has been marked as exhibit -- Exxon Exhibit Number One and would ask you to briefly describe its contents.

A Yes. This is a plat of the area around the Shipp-Strawn Field. The Shipp-Strawn Field is located in Sections 4 and 9 of 17 South, 37 East.

In those two sections in an adjoining section, Section 3, we've indicated the wells that have penetrated the Strawn formation to the best of our knowledge.

I'd like to point out one additional well that was spotted on the Pennzoil exhibit. That's the well to the north of the dry hole symbol in the west part of Section 3. That was their, I believe, Meyers Well. It has recently TD'ed in the Strawn we know, but we do not know if the well is completed yet or not.

We've also put in Sections 4 and 9, to the best of our knowledge, the leaseholdings of all companies in these two sections. We've also pointed out the Pennzoil unorthodox proposed location and the Phillips unorthodox proposed location.

To the north we've indicated an area in Sections 20 and 21 of 16 South, 37 East. Here recently Texaco proposed an unorthodox location. We feel it's very similar to the Pennzoil proposed unorthodox location here.

This was Case 8993 and we'll be referring to this case a little bit later on in the testimony.

Q Okay. Mr. Andrews, I now hand you Exxon Exhibit Number Two and would you please describe that briefly?

A Yes. This is a net porosity map of the Strawn formation in Shipp-Strawn Field. The scale of this

map is one inch is equal to 1000 feet. Contour interval is 25 feet and we used a 4 percent porosity cutoff in preparing this map.

We've shown the Strawn producers designated by the green dots on the map. We'd like to point out one well in the northwest quarter of the northwest quarter of Section 4, the Tidewater State U-1 Well. We have that designated as a Strawn producer; however, that has been plugged and abandoned and it is no longer producing in the Strawn formation.

As you can see, the geology here, according to our interpretation, is fairly similar to the one presented by Pennzoil earlier, with the exception of the lower pod in Sections 9 and 4 that the "EX" No. 2 Well, the Exxon well, and the Fasken No. 3 Consolidated State Well are producing out of.

So I'd like to briefly explain our basis for orienting the pod this way. Of course we did look at all the well data in the area and we looked at the well data specifically on these two wells and that gave us two points, we felt, that were in a common reservoir.

We also had dipmeters on these two wells and unlike the Pennzoil testimony earlier, we feel that there is a general relationship between structure on top of the Strawn and formation of porosity within the Strawn.

This reflects the carbonate mound nature of the deposition of the Strawn. We feel like where we had maximum Strawn mound growth we tended to have porosity developed in the Strawn; therefore structures on top of the Strawn indicate maximum mound growth and you tend to find porosity in these areas.

The dipmeter on our Exxon well showed dip primariy down dip to the east, going up dip to the west.

On the Fasken 3 Well we saw just the opposite relationship. It showed the top of the Strawn being structurally higher to the east.

We therefore concluded that there was a structure higher than both the two wells in between the Exxon well and the Barbara Fasken well. Therefore we have placed the thickest part of the reservoir in between these two wells.

Q And is it your general opinion that the reservoirs in this pool have a relatively small areal extent?

A Yes, it is. We do not think that these individual porosity pods extend over large distances.

Q Would you please now refer to Exxon Exhibit Two-A and describe that --

A Yes.

Q -- for the Commission?

A This is a structure map on top of the Strawn formation. Contour interval here is 50 feet. This map is also a one inch equal to 1000 foot scale.

The overall structure in the Shipp-Strawn Field is regional dip down dip to the east. As you can see on this map, we see two small structures in the Strawn formation. In the northwest quarter of Section 4 we see a structure designated by the closed contour of the -7200 mark, around which the two Tipperary wells are producing.

Down to the south in Section 9 we see another structure. This is where the Fasken No. 3 Consolidated State Well is producing.

Trending off this structure to the northeast we see a structural nose along which the Exxon well and the two Pennzoil Viersen wells are located and, of course, those are Strawn producers.

We feel that this map supports our opinion that there is a general, not a definite, but a general relationship between structure on top of the Strawn and the formation of porosity within the Strawn formation.

Q Mr. Andrews, were you listening to Mr. Duncan testify?

A Yes, I was.

Q And you heard him testify that based on his figures the Vierseon 2 porosity pod could be slightly

larger than as testified by Pennzoil?

A Yes, sir.

Q In your opinion what would be the effect on the Exxon/Fasken pod by having the Viersen 2 pod larger than indicated?

A We feel that any enlargement of that particular pod would have to some degree come down to the south. If this were the case, then, of course, since it has been established that there is no communication between the Exxon well and the Viersen 2 well, that the pod that Exxon and Fasken well is producing out of would have to be pushed down to the south to respect that data.

Q Mr. Andrews, is there any evidence of fractures in the Strawn reservoir?

A Yes. On core reports that we've seen on the Pennzoil Viersen No. 2 and the recent well, the Meyers well, which again is not spotted on this map, but it is located to the north of the Waldron No. 1, which is to the east of Section 4, the core reports indicate that there are fractures in the Strawn formation.

I believe a Pennzoil witness testified earlier that there were fractures in the Strawn formation.

We think that, of course, the presence of fractures in the Strawn formation greatly increases the permeability and resulting drainage area of any well that's

producing out of the Strawn formation.

Q Does Exxon request, if -- if indeed the Pennzoil proposed location is approved, does Exxon request daily drilling reports and a directional survey on the well and what is the reason for this, and please refer to Exhibit Number Three.

A Yes, sir. Yes, we do request daily drilling reports and directional surveys on the proposed unorthodox Pennzoil location should it be drilled.

The reason for this, and again we're looking at Exhibit Number Three here, we've drawn the Pennzoil unorthodox proposed location and a circle around that location. That circle indicates all possible bottom hole locations of the proposed well without the well ever exceeding a 5 degrees deviation.

As you can see, a large number of the possible bottom hole locations of that well falls on the Exxon lease. In order to insure that that well does not drift to the south and cross our lease line, we would like to monitor the drilling of the well. That's why we require the daily drilling reports and we'd also like a directional survey on the well when it reaches total depth.

Q Mr. Andrews, do you have an opinion as to a penalty which should be assessed against production from Pennzoil's Viersen No. 3 Well if this application is ap-

proved, and I would refer you to both Exhibits Four and Five?

A Yes, we do. We've calculated a potential penalty in two methods.

The first one is indicated on Exhibit Number Four. Exhibit Number Four shows the acreage distribution of the Strawn reservoir productive in the Fasken well and the Exxon well. This just looking at the number of productive acres.

As you can see at the top of the page, according to our interpretation Pennzoil has approximately 13 productive acres of that pod on their lease.

We calculate the penalty by taking that 13 productive acres and dividing it by 80 acres, which is the proration spacing unit for the Shipp-Strawn Field. That gives a production limitation factor of .16, a penalty of 84 percent of top allowable. The production limitation would therefore be .16 times 445 barrels of oil per day, which is the top allowable in the field right now, and that would result in an allowable of 71 barrels of oil per day for the Pennzoil location. This would be applied to the 80-acre oil proration unit.

This method was used in a similar case in this area, Order No. R-8239.

The second method that we used to

calculate a penalty is shown on Exhibit Number Five. This shows a volume distribution of the Strawn reservoir productive in the Fasken and Exxon wells. So here we looked at not only the acres but the total acre feet of reservoir.

At the top of the page we indicate that Pennzoil has approximately 360 acre feet of productive reservoir on their lease. Total volume of the productive reservoir, according to our interpretation is 2509 acre feet.

To calculate this penalty we took Pennzoil's 360 acre feet, divided it by 2509 acre feet, and came up with a production limitation factor of .14; resulting penalty would be 86 percent. Production limitation would be in an allowable of 62 barrels of oil per day. This would also be applied to the 80-acre proration unit.

We feel that this is a very reasonable penalty considering that Pennzoil used a similar penalty calculation when they protested or excuse me, when they wanted to assess a penalty to the Texaco well to the north that we pointed out on Exhibit Number One.

In that case, 8993, the proposed Texaco well was 150 acres from the lease line and Pennzoil recommended, I believe, a 94 percent penalty. The OCD did assess a penalty of 86.6 -- excuse me, 87.6 percent. We feel that the methodology that Pennzoil used, which was similar to

this one, was fair. We feel that the OCD penalty assessed to Texaco was fair, and we feel that that methodology is applicable in this case, also.

Q In Exhibit Four, Mr. Andrews, why did Exxon calculate this penalty based on 80 acres?

A We calculated the penalty based on 80 acres because of Pennzoil's request of simultaneous dedication and a shared allowable. We were concerned about the possibility of perhaps they make a very good well in their Viersen No. 3 location. They could, as we've mentioned earlier, shut in the Viersen No. 2 and produce the entire allowable, whatever they receive, in their well to the south. We wanted to make sure, in the event of this happening, that the allowable given to the 80-acre unit was what we felt was equitable.

Q Referring to Pennzoil Exhibit Number One, if you would refer to that, what would be the approximate porosity thickness at a legal location on the Pennzoil Exhibit Number One?

A It would be somewhere between 20 and 40 feet, in that vicinity, approximately.

Q Does this compare -- how does this compare with the Fasken well?

A It would compare favorably with the Fasken well. The Fasken well found, according to the Pennzoil

exhibit, 12 feet, according to ours, 14 feet, a negligible difference, and they have, of course, a very good well there.

We feel that a well, considering the permeability, fractures in the Strawn, that encountered, let's say 20 feet or 30 feet of porosity, would be a very good well.

Q Mr. Andrews, in your opinion will the granting of Pennzoil's application with the assessment of a penalty as recommended by Exxon, be in the interest of conservation, the prevention of waste, and the protection of correlative rights?

A Yes, sir.

Q Were Exhibits One through Five prepared by you or under your direction?

A Yes, they were.

MR. BRUCE: Mr. Chairman, at this time I would move the admission of Exhibits One through Five.

MR. STAMETS: The exhibits will be admitted.

MR. BRUCE: I have no further questions at this time.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Andrews, if the calculation is correct that the Exxon well is draining 272 acres, would not the pod that you've drawn on Exhibit Two have to be made larger?

A Yes, sir. If I understand the 272 acre mark or figure, they're suggesting that this reservoir is 270 acres in areal extent. That does not meet with our interpretation of the individual Strawn porosity units in this area. I would disagree using the information that I have at hand on the 272 acre figure. I disagree with that figure.

Q Have you made a separate calculation to demonstrate the productive acres associated with the Exxon well?

A No, sir. What we have here is an estimate of the size of this porosity pod based on what we think are the sizes of the porosity pods in the other producing wells here in the field.

As we mentioned earlier, we are not that far in disagreement with Pennzoil. We think that, as you can see, the dry hole control around these pods, that they're not very arealy extensive, and we really think that this is a better interpretation knowing the depositional

nature of the Strawn in the area. We have no real exact way of coming up with a rock solid calculation on the areal extent of this.

Q You could have made the calculations made by Mr. Groce and you did not make those calculations.

A If I understand Mr. Groce's calculations, he used those with two bottom hole pressure tests, I believe, if I understand his interpretation correctly.

We have run one bottom hole pressure test in our well. I'm not a reservoir engineer. I've been told by our reservoir engineers that the test was not conclusive and we really were not able to derive much information , especially toward indicating size of this reservoir from that bottom hole pressure test.

Q Looking at your Exhibit Number Two-A, the structure map, if the Pennzoil well were drilled more approximate to a standard location, say at 510 feet from the south line, which is the closest standard location, it does not appear to me that they -- they would gain or lose any structural position, within a few feet.

A Yes, sir, were they to drill an orthodox location there we feel that structurally they would be in just as advantageous a position as their proposed unorthodox location, that's correct.

Q Okay. If we would accept your pod de-

scription as shown on Exhibit Two, they'd be out in the middle of no man's land between two pods and have a dry hole.

A Excuse me, sir, I didn't understand the question.

Q If they drilled at a standard location at -- and if the geologic conditions are as you show on Exhibit Number Two, then they probably would have a dry hole.

A Yes, sir, because according to our interpretation, they really don't have that much productive reservoir on their lease. We feel that a standard location would certainly be a lot riskier than where they're drilling now and according to our interpretation, it would most likely be a dry hole, yes, sir.

Q Now you've oriented the pod on your Exhibit Number Two in sort of a northwest/southeast direction.

A Yes, sir.

Q And yet when we look at the structure map it seems as though the general structural trend in that area is from southwest to the northeast, and I thought your testimony was that structure sort of generally reflected the porosity development, build up these algal mounds.

A Yes, sir.

Q Are -- have you --

A Seems to be a contradiction there.

Q Yes, there seems to be a contradiction.

Can you explain it?

A Yes, sir, I sure can.

Q The description of general relationship is one that we really want to emphasize here. As you can see, the Fasken well is further up dip than our well by almost 100 feet, yet they only found 14 feet of productive reservoir. We found 67 feet. I point that out to show that it is not a 1-to-1 correlation between the two.

We also appear to have a continuous structural nose trending off this structure going through the two Pennzoil Viersen locations. As you can see, we have not honored exactly the structure on the orientation of those two pods. As a matter of fact, they seem to run perpendicular to the nose. And this interpretation is fairly similar to the one that Pennzoil presented.

All we can say, again, is that the relationship that we have determined is that structures on top of the Strawn seem to indicate that there is porosity in the Strawn nearby, the specific orientation of that porosity within the overall Strawn unit to us is still a very tricky relationship and I can't say that we've determined that exact relationship.

Again what we're comfortable in saying is where you find structures, you tend to generally find porosity in the Strawn.

Q You talked about the dipmeter information and you indicated that the Fasken well showed to be down to the west, up to the east, and the Exxon exactly the opposite, with a high in between.

A Yes, sir.

Q And you've drawn that on Exhibit Number Two?

A The structure map is on Two-A. The resulting porosity map on Exhibit Two was based on that relationship, yes, sir.

Q So you're not trying to draw Exhibit Number Two from the evidence derived from the dipmeter.

A No, sir, I'm sorry I misquoted myself. We did see that you could get structurally higher in the Strawn somewhere between these two wells. Based again on the general relationship of porosity and top of the Strawn, we felt it logical to draw the thickest part of the porosity somewhere in between those two wells corresponding to the structural high.

Q Has -- hasn't Pennzoil done that on their Exhibit Number One?

A They have drawn it to an extent. I would say that perhaps the dipmeter on the Fasken well shows a bit more westerly orientation than northerly, but for the most part they -- they have not contradicted dipmeter data, I

don't believe, on their interpretation. no, sir.

MR. STAMETS: Are there other questions of the witness?

Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Chairman.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q To follow up on Mr. Stamets' question, Mr. Andrews -- Andrew or Andrews?

A Andrews.

Q Mr. Andrews, am I correct in understanding that in arriving at your net porosity Isopach, your Exhibit Number Two, you have taken one interpretation which you believe is consistent with and honors the available data, the geologic data --

A That we have, yes, sir.

Q What is it that you have that you've relied upon?

A Well, we have electrical log data in the area.

Q On the Exxon well?

A On all the wells in this area we have electrical logs. And, of course, as we just stated, we have

dipmeters that we think assist in our interpretation.

Q Taking that same information and having re-examined Pennzoil's Exhibit Number One, am I correct in understanding your response to Mr. Stamets that Mr. Hair's orientation of the Strawn pod is certainly consistent with the data and can represent another reasonable interpretation?

A Yes, sir, that's correct.

Q When was the Exxon well drilled, Mr. Andrews? I think I have forgotten.

A Okay.

Q About when?

A Let me get my notes so I can tell you exactly. Exxon well completed in February of 1986.

Q Okay. Did you participate in determining hte well location for Exxon when they drilled that well?

A No, sir, my predecessor who worked this area, worked up that location. I worked this area after the No. 2 "EX" was drilled.

Q Your involvement in this area for your company is after February of '86.

A Yes, sir.

Q And who was your predecessor?

A It was a geologist namd Pauy Molnar, M-O-L-N-A-R.

Q What was the first thing that you did when you were assigned the responsibility for Exxon's acreage within the Shipp-Strawn Pool?

A Yes, sir. We reviewed all work that had been previously done, not only for the Shipp-Strawn Field, but for the area in general. We reviewed it with our predecessor, or excuse me, I reviewed it with my predecessor. We went over everything. He showed me what he did. I satisfied myself that his was good work. I thought it was, and that was the extent of my relationship with my predecessor.

Q What is your understanding, then, Mr. Andrews, of the reason why Exxon chose to drill its well at that particular location at that time?

A Our particular location is based partly on one seismic line that runs east/west across the north lease line -- or excuse me, the north section line of Section 9. We also knew that this was an area of good Strawn production and that was basically the basis.

Q At that time, Mr. Andrews, did it appear to you from available information that you were looking at a continuation of the same reservoir in which either the Viersen 2 or the Viersen No. 1 had been completed?

A I'm not sure if they considered a continuation or not. That is possibly something they discussed. I have not been told that they were looking for a continua-

tion. That's about all I can say on that.

Q Did the information available to you that you reviewed identify that there was in fact what appears to be a separate productive pod in the pool?

A At that time, of course, we did not know that we had a separate producing pod in this area.

Q What is the sequence with regards to the drilling of the other well on the Exxon tract? The dry hole to the east of the No. 2 Well, I guess it's the No. 1?

A "EX" No. 1, that's correct, sir.

Q Was that "EX" No. 1 drilled before the No. 2?

A No, sir, it was drilled after.

Q When was the No. 1 Well to the east of the No. 2, when was that drilled, approximately?

A Approximately, I'm going to speculate, March or April of '86. I'm not quite sure on the spud date. We are still trying to complete that well. It's still an active well.

Q In analyzing the dipmeter information you ahve placed an emphasis on that information to orient the pod so that the No. 2 Well appears to be to the northeast of the high point of that pod.

A To part of the pod, yes, sir.

Q All right. Did you have that dipmeter

information in the No. 2 Well at the time the No. 1 Well was commenced?

A Yes, sir, we did.

Q Wouldn't it be more consistent in relying upon that dipmeter information to have drilled the No. 1 Well over on the west side of that 160-acre unit rather than down dip farther out there in the east?

A One of the reasons that we do put such an emphasis on the dipmeter is based on the results of the "EX" 1 Well.

Q Fooled you, didn't I? I think you've confirmed for yourself or have you satisfied yourself that the bottom hole location for the Exxon No. 2 Well is in fact approximately 150 feet from the common line with Pennzoil?

A Yes, sir, I agree with that.

Q Do you see any geologic evidence or information available to you, Mr. Andrews, to demonstrate that the Exxon well is in fact not capable of producing any of the reserves that lie on the Pennzoil tract?

A No, sir.

Q In absence of a Viersen No. 3 Well drilled by Pennzoil, then you don't see any geologic reason that would preclude the Exxon No. 2 Well from draining the Pennzoil acreage?

A That's true.

MR. KELLAHIN: I have no further questions.

MR. STAMETS: Are there other questions of this witness?

Oh, yes, I had one.

RECROSS EXAMINATION

BY MR. STAMETS:

Q You requested the daily drilling reports and requirement for directional survey. I think it's an option and I'm wanting to know if this perhaps would be an acceptable option, probably information on the daily drilling report Pennzoil might not wish to share, but if Exxon were aware of the make-up of the drill string and the results of the TOTCOs as they came in, and were provided in any order approving the drilling of this well that upon a showing that a directional survey was required to assure that the well was bottomed on Pennzoil lease, would that be an acceptable alternative to Exxon?

A You're saying if we received information on the make up of the drill string, TOTCOs down to TD --

Q Uh-huh.

A -- and then a directional survey at TD.

Q Only --

A If the TOTCOs --

Q -- upon a showing by Exxon that there was an opportunity for the well to be on Exxon's acreage instead of Pennzoil acreage.

A Yes, sir, I would think that would be acceptable.

MR. STAMETS: Any other questions of the witness?

MR. BRUCE: One question, Mr. Chairman.

REDIRECT EXAMINATION

BY MR. BRUCE:

Q Mr. Andrews, based upon Mr. Duncan's testimony, in your opinion does the Exxon Isopach or Pennzoil's Isopach more accurately reflect the size of the Viersen 2 pod and the orientation of the Exxon/Fasken pod?

A Oh, I believe that the Exxon interpretation is the more accurate one.

MR. BRUCE: Nothing further.

MR. STAMETS: Any other questions of the witness?

He may be excused.

MR. BRUCE: That concludes our preentation, Mr. Chairman, thank you.

MR. STAMETS: Mr. Ives. The

witness is excused in case I didn't.

MR. IVES: Mr. Chairman, may we have a five minute break in order to re-assess our presentation in light of all the additional testimony?

MR. STAMETS: Why don't we take fifteen, and we'll finish up when we get back.

(Thereupon a recess was taken.)

MR. IVES: Mr. Chairman, I have one witness.

WILLIAM J. MUELLER,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. IVES:

Q Would you please state your full name and place of residence?

A My full name is William J. Mueller, M-U-E-L-L-E-R; we pronounce it "Miller". My place of residence is Odessa, Texas.

Q And by whom are you employed and in what capacity?

A I'm a Reservoir Engineering Supervisor with Phillips Petroleum Company.

Q And have you previously testified before this Commission and had your credentials accepted and made a matter of record?

A Yes, sir.

Q Are you familiar with the subject area in this proceeding?

A Yes, sir.

Q And are you familiar with the proposed well of Pennzoil by virtue of having attended these proceedings?

A Yes, sir.

MR. IVES: I would tender the witness as an expert reservoir engineer.

MR. STAMETS: The witness is considered qualified.

Q Could you please state exactly what the position of Phillips Petroleum Company is in this matter?

A Yes. I'd like to say one thing first, though.

I'm really disappointed. I didn't get a written invitation to this; I had to crash this party. Phillips did not get a copy of that, Tom.

MR. KELLAHIN: Because we sent

the notice out to the Turkey Ranch.

A In Case 9036 heard before the Examiner on Wednesday, Phillips had an application to drill 330 feet from the south line and 140 feet from the east line of Tract 4, as shown -- depicted on Pennzoil's Exhibit Number One, and at that time Phillips asked the Examiner to essentially impose upon us a 50 percent penalty allowable off of the 80. In other words, we testified to only 40 productive acres and we requested a 40-acre allowable, or essentially 223 barrels per day, a 50 percent penalty.

We will be drilling in that case 330 feet from the south line, which is the same common section line that the Exxon line now is 330 feet off of.

We would like to drill 140 feet off of Pennzoil's line and here they are today. They opposed us then and they're asking today to go 150 feet off their line.

So it's our -- if everybody needs nice, unorthodox locations to recover their oil we can support that because Phillips needs it, but we also would request that Pennzoil's allowable to restricted to at least whatever Phillips gets.

MR. IVES: Those are all the questions I have.

MR. STAMETS: Are there questions of Mr. Mueller?

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Mueller, the Certificate of Mailing indicates Phillips' address in Odessa, Texas, as being 4001 Pembrook, Odessa, Texas, Zip Code 79762. Are you still there?

A Yes, sir.

Q I'm sorry you didn't get it. I'm glad you're here.

A I wouldn't want to miss this.

Q I'm not sure I understood your last statement, Mr. Mueller. The arrangement between Pennzoil and Phillips with regards to their well is such that you think they're both in similar positions and therefore should be treated simlarly?

A Yes.

Q Did you understand that the Pennzoil proposed location was to be 660 feet away from the Phillips proration line with the Pennzoil line?

A True, but I also heard testimony put on by Pennzoil Wednesday that said an interference test run between I believe it was their Shipp No. 1 and some Tipperary well, that in 1650 feet between wells they saw a pressure drop of 1.4 psi per day while their well was shut in. So

drainage extends over a very large area.

Q Okay. So there is no doubt in your mind that there will be interference and communication between the Pennzoil well and the Phillips well if they're both drilled.

A That's right.

Q And yet the Pennzoil well is going to be 660 feet away from you and you're only going to be 140 feet away from them.

A That's true.

MR. KELLAHIN: I have nothing further.

MR. STAMETS: Any other questions --

MR. KELLEY: I have two or three questions of Mr. Mueller.

CROSS EXAMINATION

BY MR. KELLEY:

Q On Exxon's Exhibit Number Two with the porosity contours going into the section where you put the proposed well, you would be within that porosity, while on the Pennzoil plot you would be outside the --

A We like Exxon's picture better.

Q So you think Exxon's --

A It looks a lot more like ours.

MR. STAMETS: Any -- Mr. Bruce.

CROSS EXAMINATION

BY MR. BRUCE:

Q Mr. Mueller, were you present at Phillips unorthodox location hearing in Case 9036?

A Yes, sir.

Q And did you hear Mr. Kellahin refer to Phillips proposed unorthodox well as a turkey?

A Yes, sir.

Q Do you have any opinion as to Pennzoil's proposed Viersen 3 Well?

A I think that Mr. Kellahin said he thought he killed and plucked a turkey Wednesday, and I would like to assure the Chairman today that we have killed and cooked a goose today.

MR. STAMETS: Mr. Kellahin's statements don't always come back to haunt him quite so quickly.

MR. KELLAHIN: Mr. Chairman, it was the golden goose, but it was our goose.

MR. STAMETS: Are there any other questions of this witness?

He may be excused.

Does anyone have anything on

redirect?

MR. KELLAHIN: Yes, sir, I'd like to recall each of my witnesses for one, I hope, shortly -- short question for each.

Mr. Bruce, let me call you first, sir.

MR. STAMETS: Go ahead.

PAUL BRUCE,

being recalled and remaining under oath, testified as follows, to-wit:

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Bruce, I show you a copy of Exxon's exhibit in which Mr. Duncan has taken some information from your testimony and made a volumetric calculation. I ask you if you've had an opportunity to review that information?

A Yes, I have.

Q Do you have any additions or corrections to make to the parameters that Mr. Duncan used in making that calculation?

A Yes. I would like to state that in giving my testimony this morning I was relatively uncertain about the recovery factor that we had used in back calculat-

ing into the actual volume or area that the Pennzoil Exhibit One showed, and I think if you'll recall, I turned and asked my assistant whether we used 35 or 25 and he told me 25, and when we reviewed our numbers, we actually used 35.

Q If you used 35 in the volumetric calculation, what does that do in terms of determining the height in the calculation?

A If we have done the calculation correctly, the way that Mr. --

Q Duncan.

A -- Duncan has done, I believe the calculation would turn out to be 58 feet.

Q And if 58 is calculated to be the height, is that then consistent with Mr. Hair's Exhibit Number One in which he -- he plots the size of the Strawn pod around the Viersen No. 2 Well?

A I certainly think so. These mounds are relatively steep sided and we do have a thickness encountered in the wellbore of 77 feet.

Q All right, sir, thank you.

MR. STAMETS: Any questions of the witness?

Mr. Bruce?

RECROSS EXAMINATION

BY MR. BRUCE:

Q Is that an average of 58 feet?

A That's doing the calculation the way that Mr. Duncan did it, that's what you come out with, 58 in that.

MR. STAMETS: Any other questions?

The witness may be excused.

GREGORY L. HAIR,

being recalled and remaining under oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Hair, I'd like to direct your attention to Exxon Exhibit Number One, which was an exhibit that Mr. Andrews testified from and it showed a land map in which he made a specific reference to a Texaco proposed location in the township to the north, identifying a proposed Texaco location and subsequently in his testimony he proposed a penalty calculation based upon the order entered by the Division in Order No.. R-8239.

Were you present and did you in fact tes-

tify in the Division case that resulted in that order imposing a penalty on the Texaco location?

A Yes, I was and yes, I did.

Q Are the fact situations as you know them to exist in the Texaco case similar or different to the fact situation involved in the subject case before this Commission?

A I believe there are two similarities; both wells are nonstandard locations and they're both in the same county.

Q Are there any other similarities?

A Not that I'm aware of.

Q Would you describe for the Commission what the significant dissimilarities were between the two cases and why you therefore have concluded that the application of Order R-8239 to this case is totally inappropriate?

A First of all, if the Commissioners will review the exhibits from that case, they'll find that, of course, a number of producing wells were left off the map surrounding the Texaco proposed location. It applies that there's no control to this well, nothing is going on.

There is indeed great control to the Texaco case. As a matter of fact, there was such great control, I belive three companies testified. Their maps are almost identical, within a very small percentage of error

they are identical.

Texaco in their own case did not defend or make a statement about that they had more reservoir than anyone allows them. The reservoir is very well defined. The acreage, the volume, everything is very well defined.

In this case we have heard three different companies talk about size. Our company has said we have no idea what the size of the pod is.

Exxon has said they have no idea what the size of the pod is, and the one witness who speculated on the size said 272 acres. That's extreme divergence if ever there was any.

I do not believe that you can make a similarity there, where you have an extremely well controlled reservoir as opposed to one that's not very well controlled as to size at all.

Q Was the proposed penalty that Pennzoil suggested for the Texaco case one in which the penalty was based upon the actual producing ratios of the existing offsetting wells in relationship to the proposed unorthodox location well?

A Yes. It was based on that and I believe on what most people agreed on as reservoir volume under each tract.

MR. KELLAHIN: I have nothing

further.

RECROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Hair, do you recall in that Texaco case whether we had a similar situation where there was a well on the opposite side of the line at an unorthodox location?

A Sir, all the wells surrounding the Texaco well were at standard, legal locations.

Q Okay.

MR. STAMETS: Are there any other questions of the witness?

Mr. Bruce?

RECROSS EXAMINATION

BY MR. BRUCE:

Q Mr. Hair, concerning the Northeast Lovington well involved, or wells involved in Case 8993, just like the current case they are Strawn?

A Yes, they are.

Q And the reservoirs are contained in the porosity pods just like the Shipp-Strawn?

A Similar to the Shipp-Strawn, yes.

Q And is the depositional enviroment in the

Northeast Lovington or similar as to the Shipp-Strawn?

A I am going to have to refuse to answer that based on the fact of the proprietary information.

Q That's okay.

MR. STAMETS: Any other questions of this witness?

He may be excused.

Does anyone else have anything on redirect?

I presume we'll have some closing statements.

Mr. Padilla?

MR. PADILLA: Mr. Chairman, Mr. Kelley.

We just finished hearing Mr. Hair tell us about how there have been three attempts to figure out how much productive acreage is in all of these pods.

I would ask the Commission to take administrative notice of the Isopach introduced by Phillips in the case presented by Phillips, and that shows the different geologic interpretation as to the thickness of the pay.

In that regard, I believe in retrospect that these cases should have all been combined or

both cases should have been combined in order to present a complete view to the commission.

Had Pennzoil today presented a case that was very close to the vest. They indicated they've had interference testing done between the Viersen No. 1 and the Viersen No. 2 Wells, if they did not present it.

We believe this is the best evidence that could have been presented to show that there would be communication. We don't know for sure on the pressure decline evidence whether or not any of that pressure decline is truly indicative of separate reservoirs. Interference tests would have shown that, that there was a breakdown in permeability between the two wells.

No material balance calculations were presented by engineers for Pennzoil. We presented what we believe is the most reliable evidence here.

Our position is that under the Phillips case or under the confusing geologic data here, that Pennzoil can drill at a standard location and have a commercial production there based upon the size of the reservoir as calculated, not as speculated by Mr. Groce and his assistant.

Mr. Hair indicated just recently -- just awhile ago that we had speculated. We didn't

speculate; Mr. Groce calculated the reserves.

We also have the question of simultaneous dedication here. The Commission should have and consider the already unorthodox location that Pennzoil has in its location with the Viersen No. 2 Well. There are already -- there has already been some production and that should be taken into consideration with regard to their ability to place another well if its nonstandard.

The Fasken position obviously is that all of the wells would fairly obtain their just and equitable share at standard locations.

I don't think that you can look at the Isopach presented by Exxon and the Isopach presented by Pennzoil and come to any conclusion whether or not a standard location would be a productive well.

Obviously I think those positions are skewed to favor each of the companies, no different than what the Phillips Ispach was hung on Friday -- or on Wednesday.

Therefore we submit that we should place these wells to where they can adequately drain the reservoir. There's a question as to whether or not there is going to be waste if you place four wells on what is in effect 40-acre spacing. Phillips has asked for a nonstandard proration unit of 40 acres but that also is affected

by the fact that a portion of the 80-acre proration unit has already been condemned.

In Phillips case we argued as to the propriety of how that allowable ought to be calculated and that's a matter of record in that case.

Going back to the closeness and the tightness of the information here today, we've had numerous conditions that -- or reliance, I should say, on confidentiality. If you're going to win these cases around here I think that the companies ought to come forward with their information and totally disclose that completely to the Commission so that it can decide appropriately in these cases as to what the appropriate penalties and the propriety of even granting a nonstandard location.

Should the Commission decide, and this is the last alternative that we have, we're certainly not proposing that should the Commission decide that this case ought to be -- have a -- that a nonstandard location ought to be granted, then we request that a severe penalty be assessed.

Thank you.

MR. BRUCE: Mr. Chairman, Pennzoil is before you today seeking approval for an unorthodox well location very similar in Exxon's mind to the location Phillips seeks in the unit to the west. This is a

location which Pennzoil has disparaged and Exxon sees little to distinguish between the Pennzoil case and the Phillips case.

I think it's proper to look back at Case Numbers 8696 and 897 -- or 8790, in which these pool rules were established.

Pennzoil originally proposed the Shipp-Strawn Pool and requesting 80-acre spacing with wells located no more than 330 feet to the unit boundaries.

In Case 8790 the OCD on its own motion changed the location requirements, but in those hearings which were reopened again two days ago, Pennzoil has been consistent in arguing that these Strawn reservoirs have very high porosity, that one well will more than adequately drain 80 acres; that wells should be no closer than 990 feet together to prevent interference; that wells spaced too closely together will ineffectively drain the reservoir, and that one well per 40-acres will cause economic waste.

Exxon agrees with these positions held by Pennzoil; however Pennzoil now comes in and seeks to drill a well which would violate most of these rules or statements set forth by it. In fact, Pennzoil has testified that a well at an orthodox location would be productive and in the absence of the No. 2 Exxon Well and the Fasken Wells would drain the entire porosity pod due to the

high permeability.

In fact, the well at an orthodox location should be as productive as the Fasken Consolidated No. 3 Well. Certainly at an orthodox location under Pennzoil's interpretation of the porosity pod, the well should be able to drain its 20 acres in the southern part of its unit; therefore, we think Exxon has presented a case -- I mean Pennzoil has presented a case which requires that its application be denied for if it is granted without a penalty, other interest owners in the pool will have their correlative rights violated.

Now correlative rights is generally the opportunity afforded the owner of a property in a pool to produce without waste his fair share of oil in the pool.

Pennzoil's testimony in this case and at the hearings on the Shipp-Strawn Pool, show that if the Viersen 3 Well is drilled it will cause the reservoir to be ineffectively drained and thus cause waste. Again this is a reason to deny the application as set forth by Pennzoil.

Furthermore, the present case involves the entire west half southeast quarter of Section 4. This unit already has the Viersen 2 Well on it, a well which has paid out and produced approximately 70,000 barrels

of oil.

Therefore Pennzoil has already recovered substantial hydrocarbons from its unit. In fact it now wants to drill the Viersen 3 Well at an extremely unorthodox location with no penalty. This would be unfair to the offsetting interest owners.

Now the geology in the immediate area of the Viersen 3, the No. 2 Exxon, the Philips and the Fasken wells, are fairly well defined but there are limits of uncertainty.

It shows a porosity pod approximately 60 to 70 acres in extent with only about 15 to 20 percent of Pennzoil's acreage productive. Exxon took this a step farther and calculated in or factored in porosity thickness. Again the Pennzoil acreage contains only about 15 percent of the reservoir volume.

Pennzoil has also been carping on Exxon's well location. I think we should note that Exxon did nothing not allowed by the pool rules and these pool rules were proposed by Pennzoil.

I also think that in a case like this you take them as you find them. As Mr. Kellahin himself said in his closing argument on behalf of Pennzoil in Case Number 8993, in discussing unorthodox locations and correlative rights, "What we consider in terms of balancing

equities between the tracts is not what happened in the past but what happens in the future. It's a prospective view of correlative rights."

The Exxon well isn't at issue today. What is at issue is how can Pennzoil produce its fair share of remaining reserves under its tract without impairing correlative rights.

Exxon submits that the only way to protect correlative rights if the unorthodox location is permitted is to assess a substantial penalty. Exxon calculated that penalty in two ways, one based on productive acres, and one based on reservoir volume. Both calculations yield a penalty on the order of 85 percent. Exxon feels that such a penalty is fair, especially considering that Pennzoil supports a penalty against the Philips well to the west.

In conclusion, Mr. Chairman, if Pennzoil's unorthodox location is approved, a penalty such as the one suggested by Exxon is necessary in order to protect the offset owners correlative rights and to prevent physical waste and economic waste.

Exxon also reminds the Commission of its request for downhole monitoring and would also request that adequate metering of production on the Viersen 3 Well be required, if necessary.

And finally, we would request permission to submit a proposed order to the Commission.

Thank you.

MR. STAMETS: Mr. Ives.

MR. IVES: May it please the Commission, Phillips Petroleum Company has appeared here today before you and does not oppose the unorthodox location that is proposed by Pennzoil in this matter.

Rather Phillips is merely seeking to insure that fairness with regards to production from the reserves in this pool is preserved. Toward that end Phillips is asking for consistency and its fair opportunity to produce its fair of reserves underlying its lease property in the Shipp-Strawn Pool.

Therefore we would simply ask that in connection with ruling on the application of Pennzoil which is currently before the Commission an appropriate penalty be applied which will insure an opportunity to each and every one of the leaseholders to produce their fair share and protect correlative rights in this particular circumstance.

MR. STAMETS: Mr. Rogers, do you have anything to add in your support of Exxon this morning?

MR. ROGERS: No, sir, I do not,

other than the letter presented to you earlier.

MR. STAMETS: Thank you.

Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Chairman. It's always a pleasure to come before the Commission and see some of my new friends and some of my old friends and to talk about what I think is a very interesting problem.

I appreciate hearing from Mr. Ives his comments about not proposing a penalty on the Pennzoil location. I think that's a clear and distinct understanding of the Commission rules and regulations. Phillips has absolutely no standing upon which to complain to our location. They are, in fact, the parties encroaching upon us. It doesn't take any degree of intelligence to look at one of these maps and figure out we're 660 feet away from them and they're going to be 140 feet away from us. Seeing that, obviously they have no objection.

We look to Mr. Bruce's comments about Exxon. Mr. Hair said in an ideal situation one well in any of these pods could drain the whole thing. We've got wonderful permeability and in a perfect world one well will drain the entire reservoir within any of these pods.

It would be marvelous if the Commission and all the operators in fact had one what Penn-

zoil had suggested in the beginning, is that keep these wells spaced far apart and develop it on true 80-acre spacing. Unfortunately the surface ownership does not always understand or care where the reservoir is.

It is not a perfect world. The imperfection in this reservoir was infested (sic) upon us by the Exxon well and they are the ones that are 150 feet away from us. It is our correlative rights that we are seeking to protect.

We think it's an interesting problem but it doesn't provide an unsurmountable problem for the Commission. We think you ought to give some reliance to Mr. Groce's position in here. Here's a party that probably has the least to complain or object about in terms of our location. There are going to be at least two wells that are going to compete for his share of the reservoir before the Pennzoil well ever gets a chance.

Mr. Padilla wants to take reliance upon the technical information given to you by Mr. Groce and I'm certainly willing to rely on it. He said based upon his professional opinion as a reservoir engineer he would allocate that 272 acre reservoir. He would take 80 of it, give 80 to Exxon, 80 to Pennzoil, and 30 to Phillips, and if you're going to talk about a fair allocation, that looks as fair as any. In that situation there is certainly

no reason to penalize the Pennzoil location for simply reacting to set up counter-drainage to protect itself from the continual and significant drainage that's occurring because of the Exxon well at its location.

It's your obligation and mandate to prevent waste. This is not a waste case.

It's also your mandate to protect correlative rights and it says in the statute and the rules and regulations that you may where appropriate provide certain penalties. We believe that in order to provide us an opportunity to produce our share of the reservoir, that in that instance no penalty should be provided because by approving this application you put us in a competitive position with the other operators and give us a chance to recover our share of the oil.

We would concur that we have an obligation and responsibility to get no closer than 150 feet. As the chairman suggested in questions to the Exxon witness, there are existing rules and regulations to provide that and we'll be happy to follow the guidelines of the Commission and provide certain information to Exxon and they can require from us if they want a directional survey pursuant to the rules.

We are certainly here ready and willing to admit that there are about 10 acres of our tract

that have been produced by the Viersen No. 2 Well; that the balance of our acreage is presumed productive and we'll be happy to produce the Viersen No. 2 first, but pleaae give us an opportunity to compete fairly with the Exxon well and do not impose a penalty upon our allowable that results in nothing more than Exxon producing our oil.

It would be very nice, I guess, to see this after it's drilled and actually calculate the net productive acreage underlying each of the tracts and maybe that's where we end up after all the wells are drilled. We're going to have to come back in for remedial relief to adjust and prorate the four wells in this pool in order to keep Exxon from taking it all.

Mr. Bruce quoted me in terms of correlative rights. I think that statement was correct then and I think it's correct now. Correlative rights are prospective. If they were not, then we would be seeking compensatory damages from Exxon to recover our share of their production that they've already taken from our location. That is not the case and we simply want the opportunity to prospectively protect ourselves.

You're dealing here with the most knowledgeable operator in the pool. Pennzoil has significant years of experience and has spent hundreds of thousands of dollars developing this reservoir. You're

playing in their own backyard. If you're judging the credibility of these witnesses, I would suggest that you rely upon the credibility of Mr. Hair and Mr. Bruce, who have years of experience dealing with a very complex reservoir and that you rely upon their judgment and in their judgment the best way to protect Pennzoil is to let them do as they have requested in this application.

Thank you.

MR. STAMETS: Thank you, Mr. Kellahin.

Let's talk about this and see if we're where we can render a decision or if we want to let people submit proposed orders.

(There followed a discussion off the record.)

MR. STAMETS: I sense that Mr. Kelley, like I, is somewhat of the feeling that we need to spend some time with this and so we will take the case under advisement and request the submittal of this supplemental information and any proposed orders by the first Tuesday in December, and would then propose to issue an order on the 18th when we meet to issue orders in the cases that were heard in the earlier portion of this docket.

Does everybody understand? Any

questions?

With that, then, the hearing will be adjourned.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY the foregoing Transcript of Hearing before the Oil Conservation Division (Commission) was reported by me; that the said transcript is a full, true, and correct record of this portion of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR